Technical Report No. 10

Air Emissions Inventory for the Greater Metropolitan Region in New South Wales

Emissions to Area Report Analysis: Excel Workbook Instructions

Department of Environment & Climate Change NSW

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Table of Contents

List of Tables

List of Figures

1 INTRODUCTION

The Department of Environment and Climate Change NSW (DECC) has completed a three year air emissions inventory project (DECC, 2007a; DECC, 2007b; DECC, 2007c; DECC, 2007d; DECC, 2007e; DECC, 2007f; DECC, 2007g; DECC, 2007h; & DECC, 2007i). The base year of the inventory represents activities that took place during the 2003 calendar year and is accompanied by emission projections in yearly increments up to the 2031 calendar year. The area included in the study covers greater Sydney, Newcastle and Wollongong regions, known collectively as the Greater Metropolitan Region (GMR).

The study region defined as the GMR measures 210 km (east-west) by 273 km (north-south). The study region is defined in Table 1.1 and shown in Figure 1.1.

Table 1.1 Definition of Greater Metropolitan, Sydney, Newcastle and Wollongong regions

Region	South-west corner MGA[1] co-ordinates		North-east corner MGA[1] co-ordinates	
	Easting (km)	Northing (km)	Easting (km)	Northing (km)
GREATER METROPOLITAN	210	6159	420	6432
SYDNEY	261	6201	360	6300
NEWCASTLE	360	6348	408	6372
WOLLONGONG	279	6174	318	6201

[1] *MGA = Map Grid of Australia based on the Geocentric Datum of Australia 1994 (GDA94) (ICSM, 2002).*

The air emissions inventory includes emissions from biogenic (i.e. natural) and anthropogenic (i.e. human derived) sources.

The anthropogenic source groups included in the air emissions inventory are as follows:

- Commercial businesses (i.e. non-EPA-licensed);
- Domestic-commercial activities;
- Industrial premises (i.e. EPA-licensed);
- Off-road mobile (i.e. non-registered off-road vehicles and equipment); and
- On-road mobile (i.e. registered on-road vehicles).

The pollutants inventoried include criteria pollutants specified in the *Ambient Air Quality NEPM* (NEPC, 2003), air toxics associated with the *National Pollutant Inventory* (*NPI*) *NEPM* (NEPC, 2000) and the *Air Toxics NEPM* (NEPC, 2004) and any other pollutants associated with state specific programs, including: *Load Based Licensing* (*Protection of the Environment Operations (General) Regulation 1998* (PCO, 1998)); and *Protection of the Environment Operations (Clean Air) Regulation 2002* (PCO, 2005).

This document contains instructions that explain the navigation and use of the accompanying Microsoft® Excel™ 2003 workbooks. While the instructions specifically relate to the Excel™ workbook tr10aei08260cp.xls (which is based on an Emissions to Area Report for criteria pollutants in the GMR during 2003 that has been extracted from the Emissions Data Management System (EDMS v1.0) (DECC, 2008)), the principles can easily be applied to the Excel™ workbooks for other air pollutants groups.

The EDMS v1.0 is an overarching air emissions inventory database that links to individual source-specific databases comprising all the data necessary to service policy and technical related queries. The EDMS uses the Microsoft® SQL Server 2005™ relational database management system (Microsoft, 2008) which is a comprehensive, integrated data management and analysis software package.



Figure 1.1 Definition of Greater Metropolitan, Sydney, Newcastle and Wollongong regions

2 USING THE EXCEL™ WORKBOOK

This document contains instructions that explain the navigation and use of the accompanying Microsoft® Excel™ 2003 workbooks. While the instructions specifically relate to the Excel™ workbook tr10aei08260cp.xls (which is based on an Emissions to Area Report for criteria pollutants in the GMR during 2003 that has been extracted from the Emissions Data Management System (EDMS v1.0) (DECC, 2008)), the principles can easily be applied to the Excel™ workbooks for other air pollutants groups.

2.1 Download and Install Workbook and Instructions

2.1.1 Create Directory

Open Windows Explorer and create a new directory on your computer hard drive (e.g. C:\\nsw_gmr_aei_2003\) by selecting “File”, “New” and “Folder” from the command menu as shown in Figure 2.1.

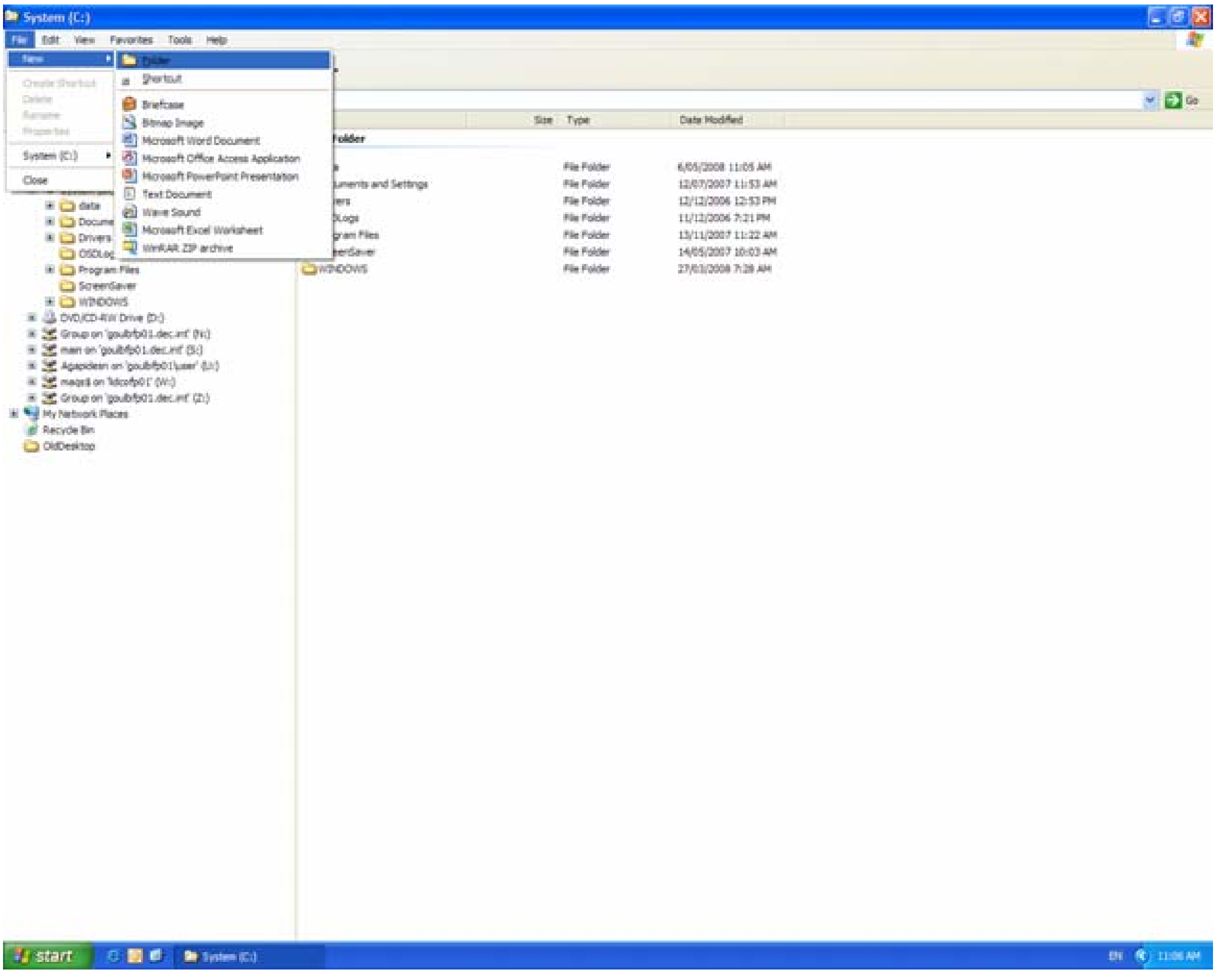


Figure 2.1 Create directory “C:\\nsw_gmr_aei_2003\”

2.1.2 Download Workbook and Instructions

Download the .pdf file containing these instructions and the .zip file containing the Excel™ workbook from the following web links and save to the directory created:

- http://www.environment.nsw.gov.au/resources/air/tr10aei08260.pdf
- http://www.environment.nsw.gov.au/resources/air/tr10aei08260cp.zip

2.1.3 Extract Workbook

Extract the following file from the .zip file to the directory created:

- tr10aei08260cp.xls - Excel™ workbook

To extract the file, double left mouse button click the .zip file, highlight the file listed above, select “Extract” from the command menu, select the directory to “Extract to” in the window and select the “Extract” button as shown in Figure 2.2.

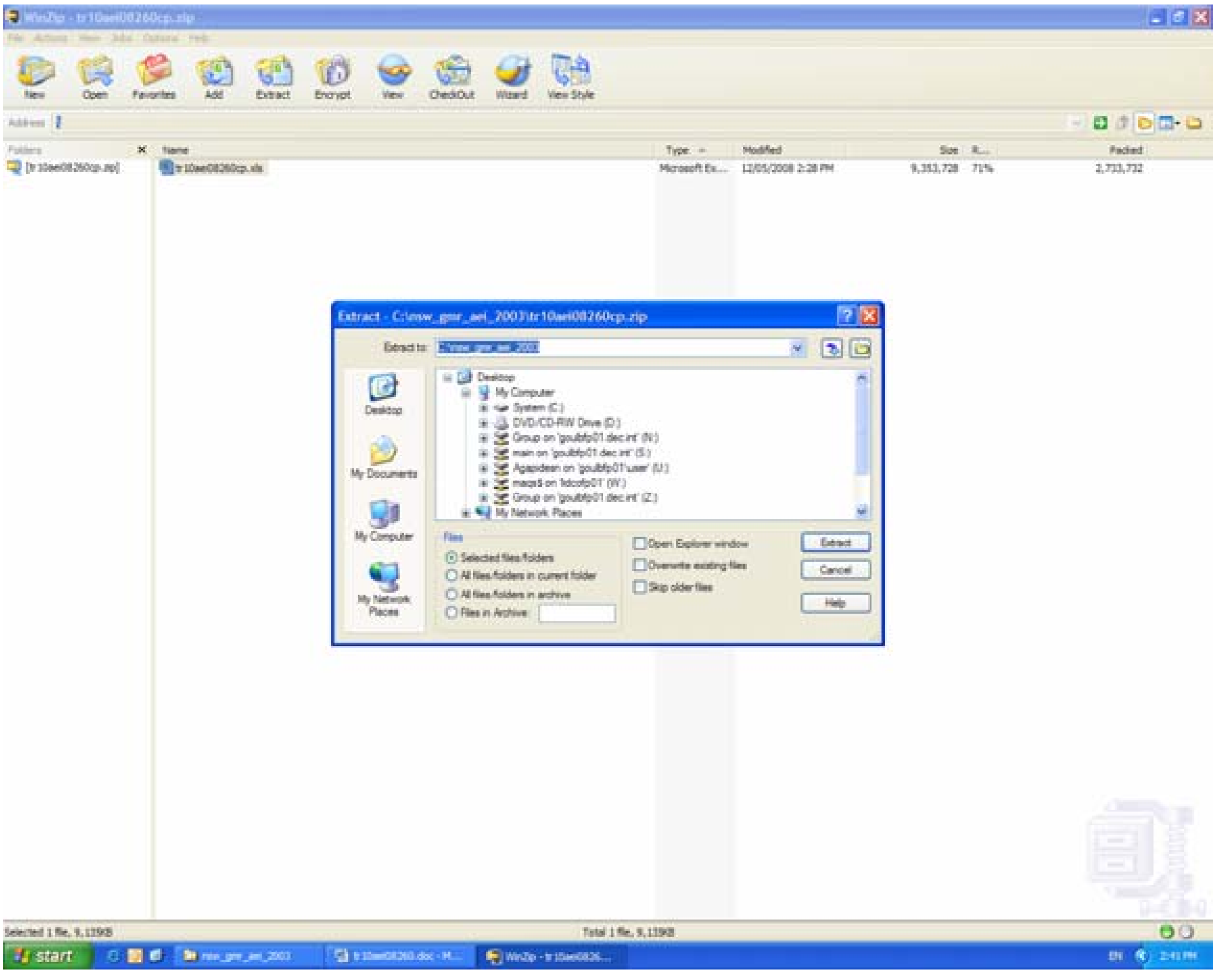


Figure 2.2 Extract “tr10aei08260cp.xls”

Ensure the Excel™ workbook and these instructions are contained in the same directory so you can navigate to the instructions from the Excel™ workbook.

2.2 Using the Workbook

2.2.1 Open Workbook

Open Windows Explorer and navigate to the Excel™ workbook at C:\\nsw_gmr_aei_2003\ tr10aei08260cp.xls. Double left mouse button click the Excel™ workbook file as shown in Figure 2.3.

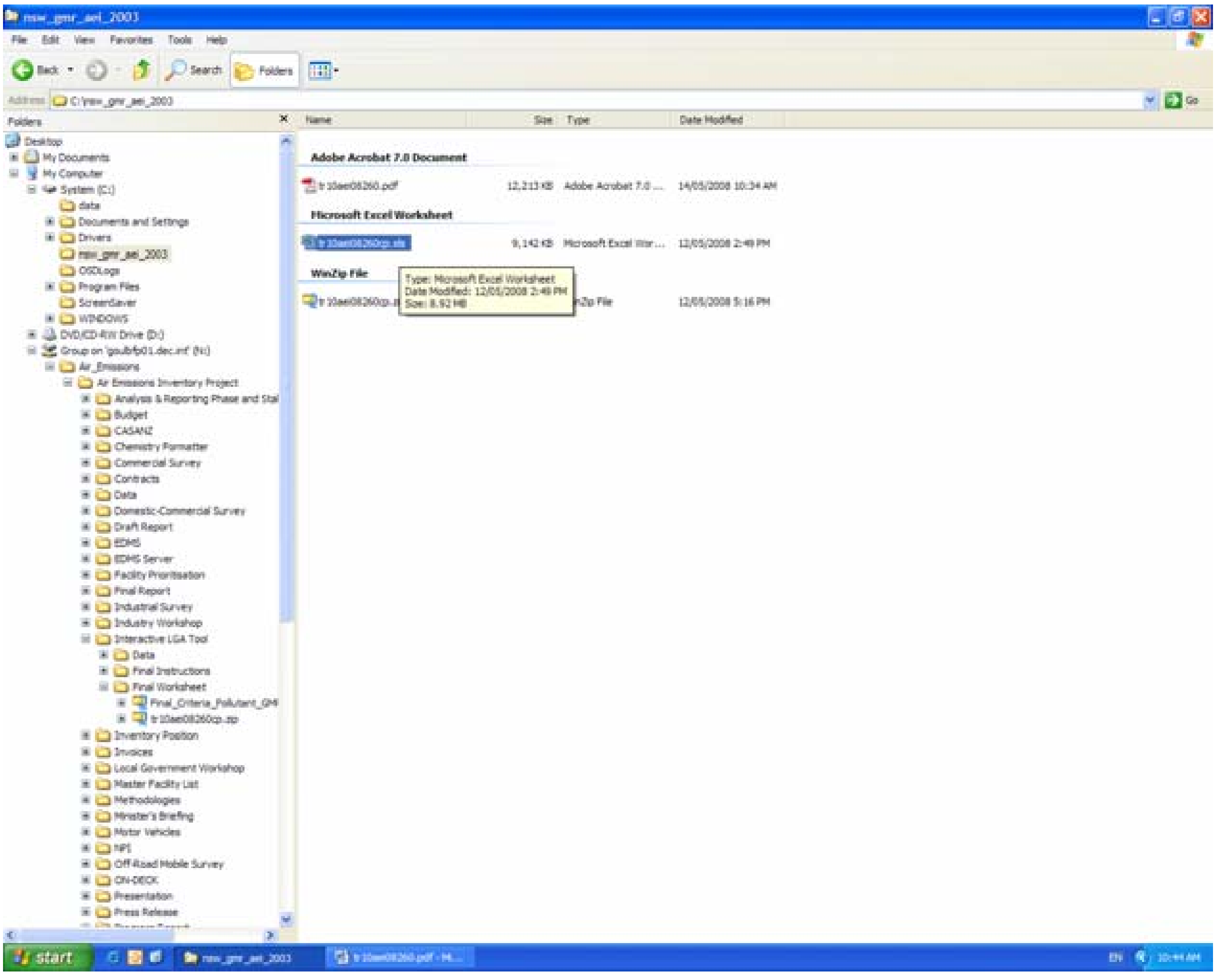


Figure 2.3 Open Workbook "tr10aei08260cp.xls"

2.2.2 Enable Macros

A “Security Warning” dialog box will now appear, which allows you to select from the following options:

- Disable Macros
- Enable Macros
- More Info

Select “Enable Macros” as shown in Figure 2.4.

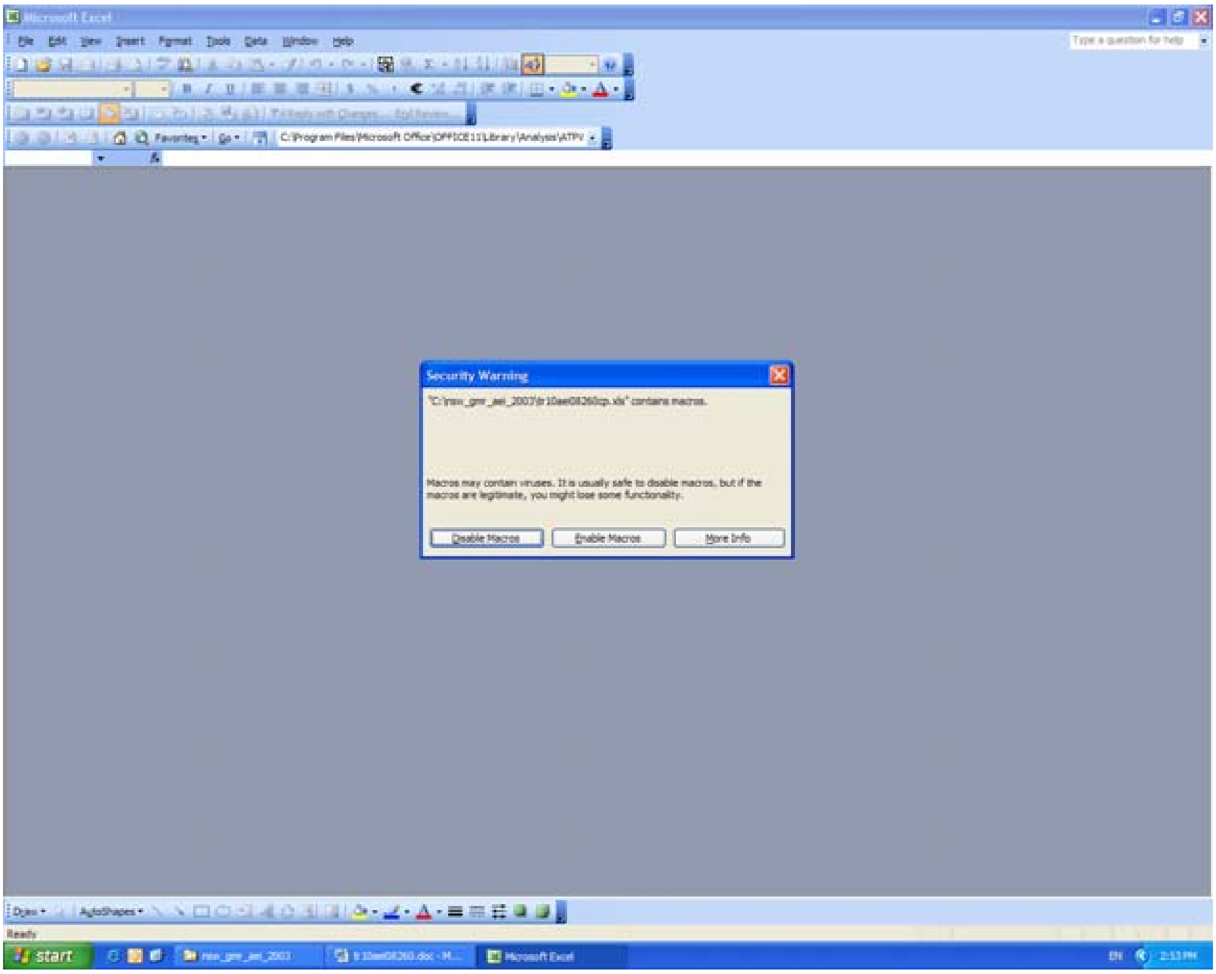


Figure 2.4 Select “Enable Macros”

2.2.3 Macro Security Settings

You may need to adjust your Excel™ macro security settings to run the macros built into the Excel™ Workbook. If necessary, follow the steps below:

- **Step 1** - Select "Tools" and "Options" from the command menu as shown in Figure 2.5

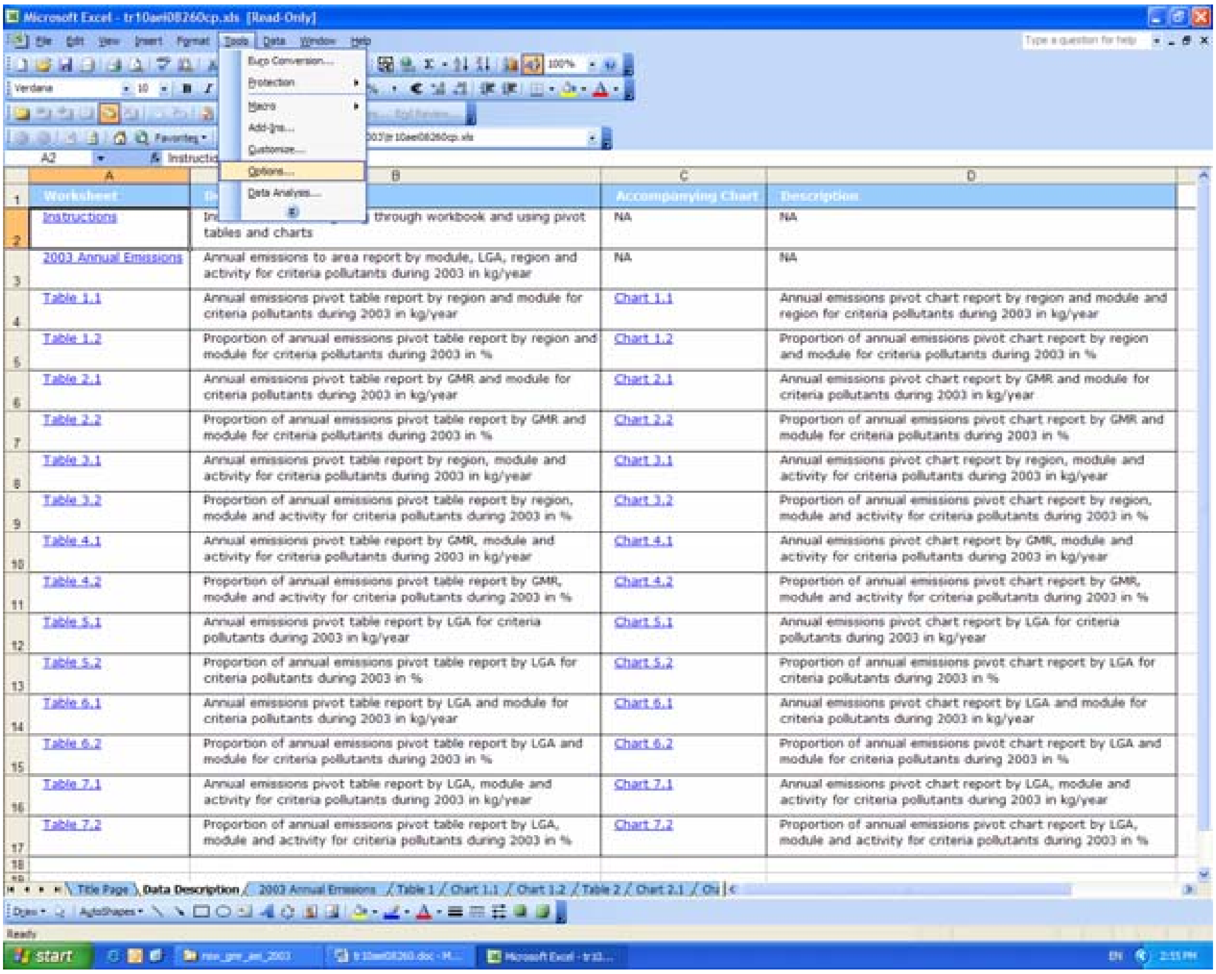


Figure 2.5 Select "Tools" and "Options"

- **Step 2** - Select the "Security" tab and "Macro Security" button as shown in Figure 2.6

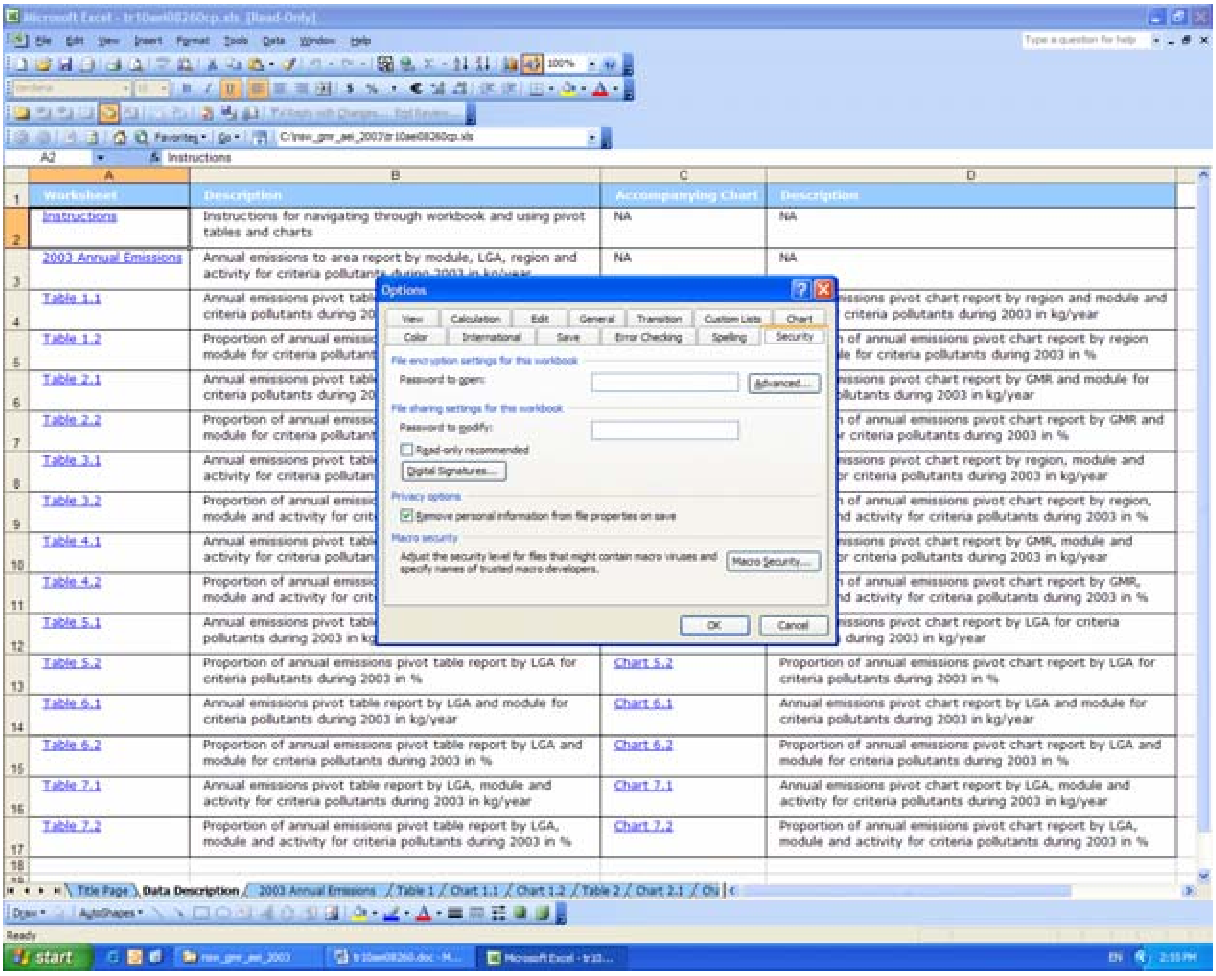


Figure 2.6 Select "Security" and "Macro Security"

- **Step 3** - Select the "Security Level" tab and "Medium" radio button as shown in Figure 2.7

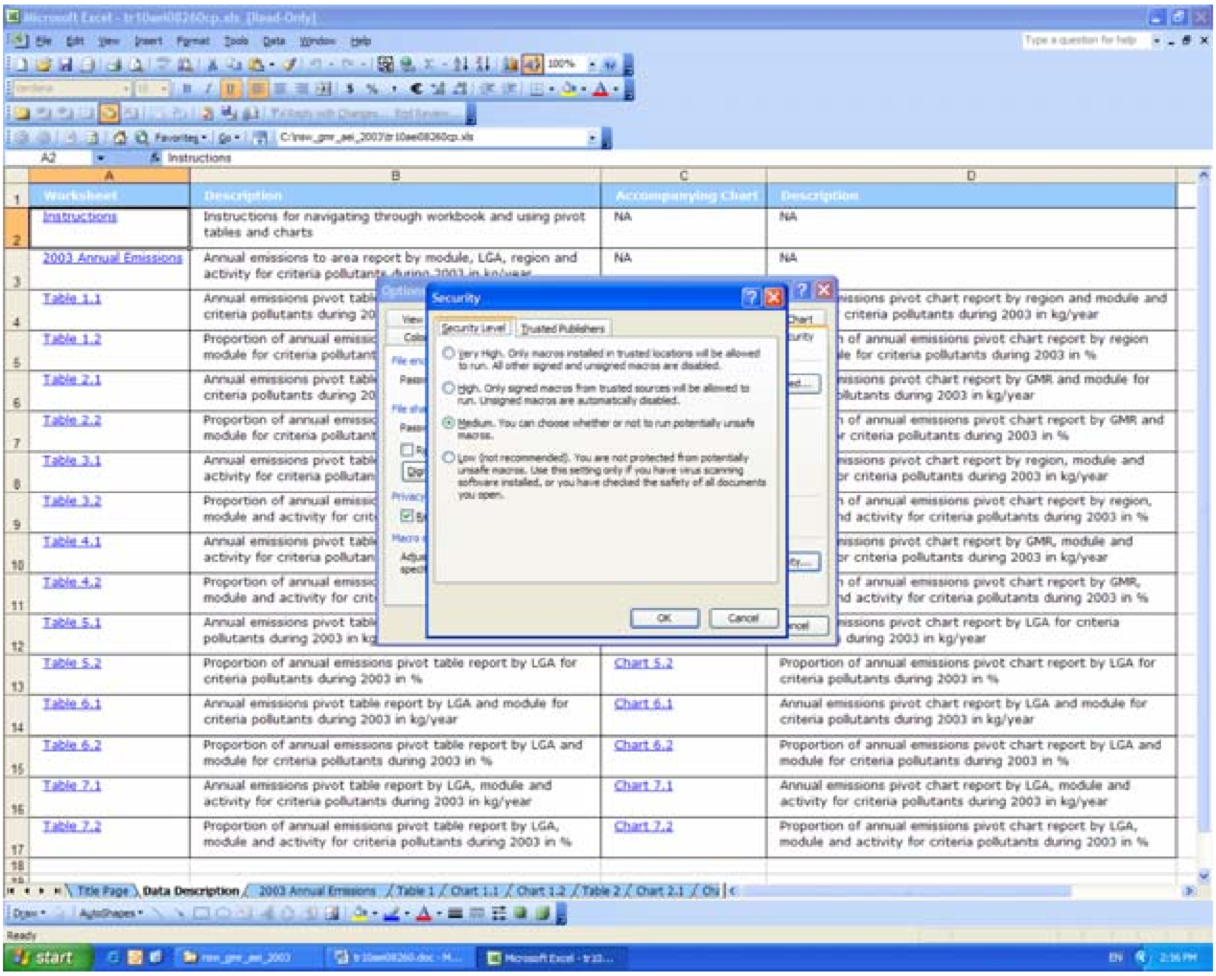


Figure 2.7 Select "Security Level" and "Medium"

- **Step 4** - Select the "OK" button twice

2.2.4 Password Protection

The Excel™ workbook is write-protected to ensure the data cannot be overwritten and requires a password to modify it. When the “Password” dialog box appears, select the “Read Only” button as shown in Figure 2.8.

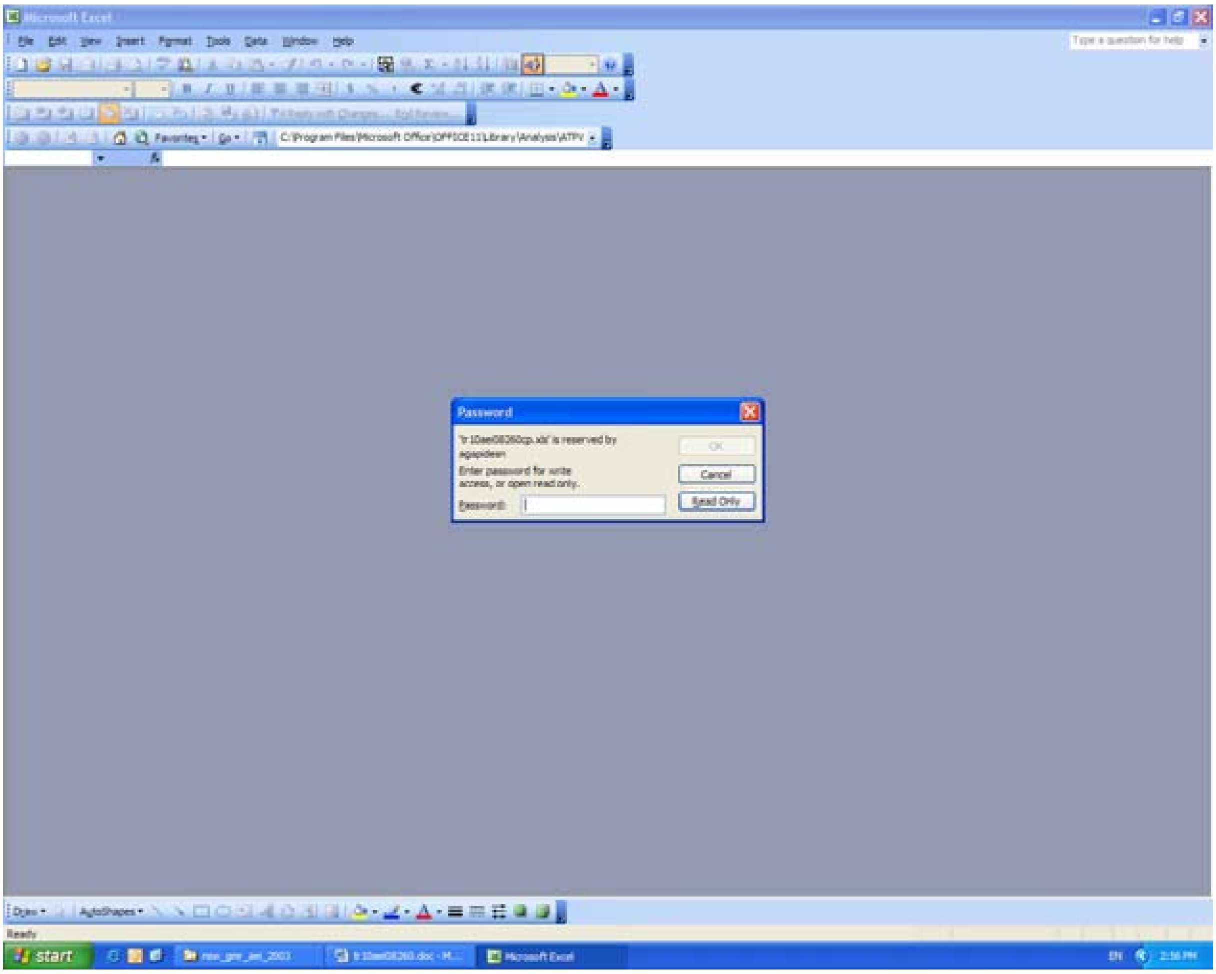


Figure 2.8 Select “Read Only”

2.2.5 Saving Changes

If you wish to save any changes to the Excel™ workbook, select "File" and "Save As" from the command menu as shown in Figure 2.9, use a different file name and select the "Save" button as shown in Figure 2.10.

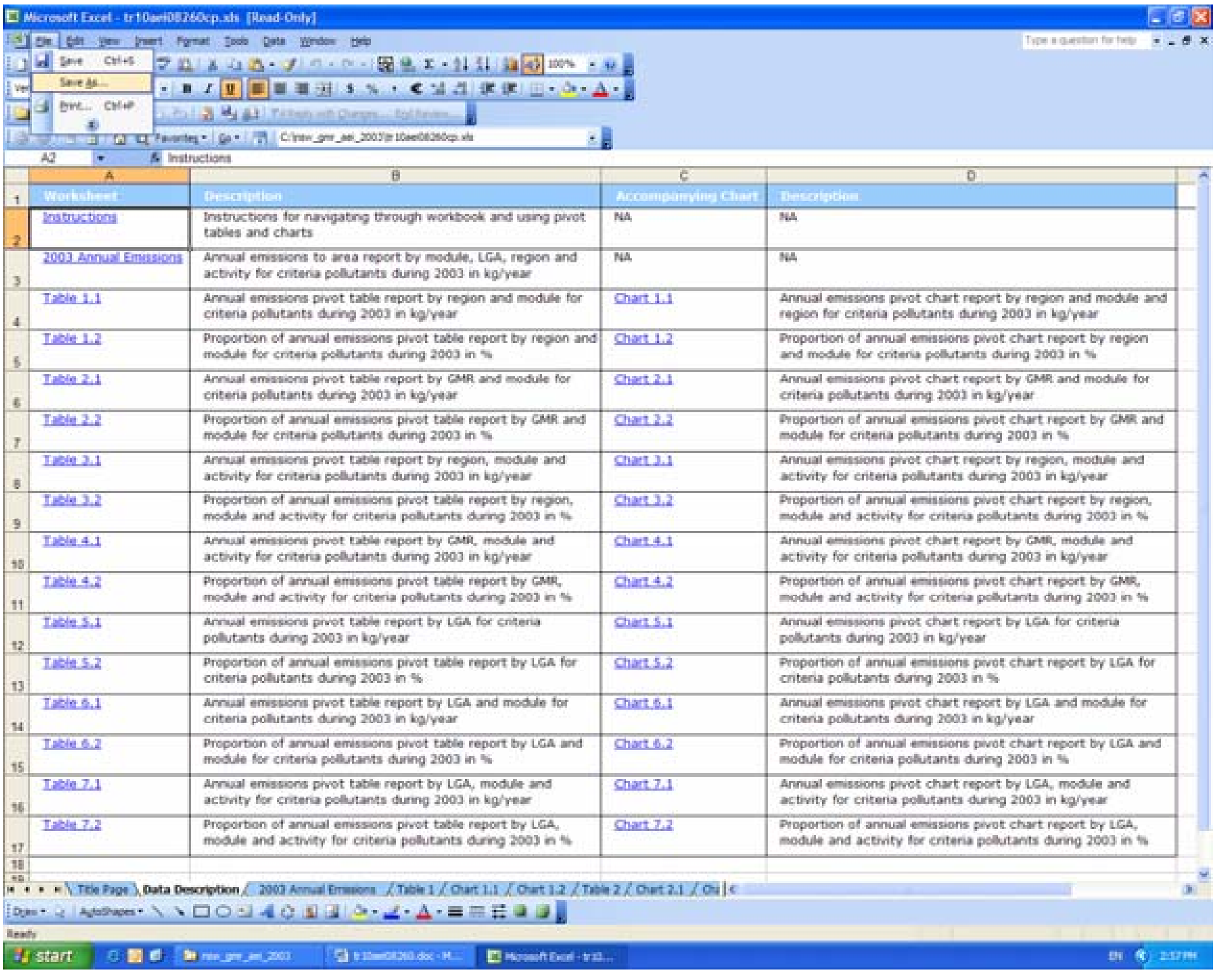


Figure 2.9 Select "File" and "Save As"

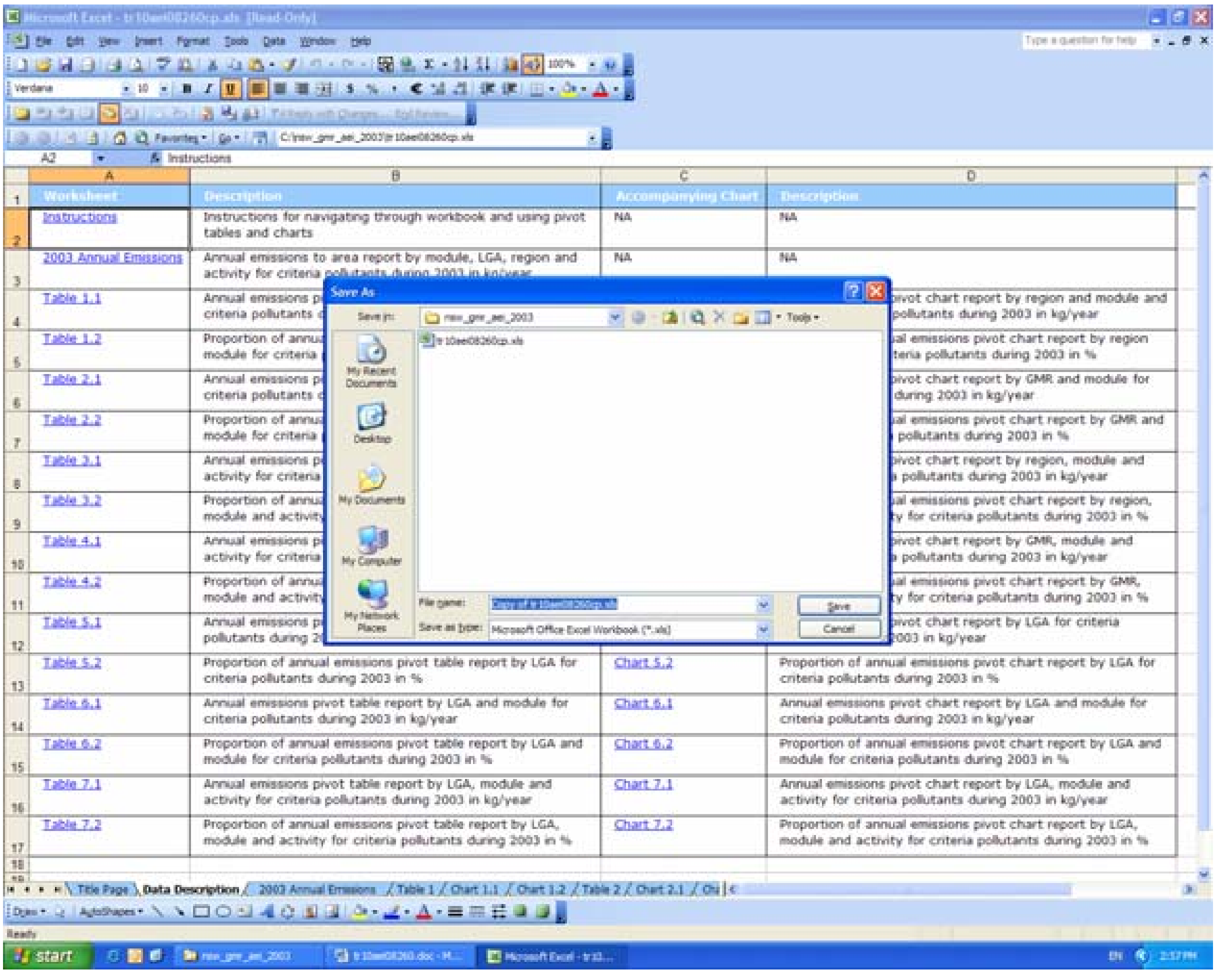


Figure 2.10 Select "Save"

2.3 Navigate the Workbook

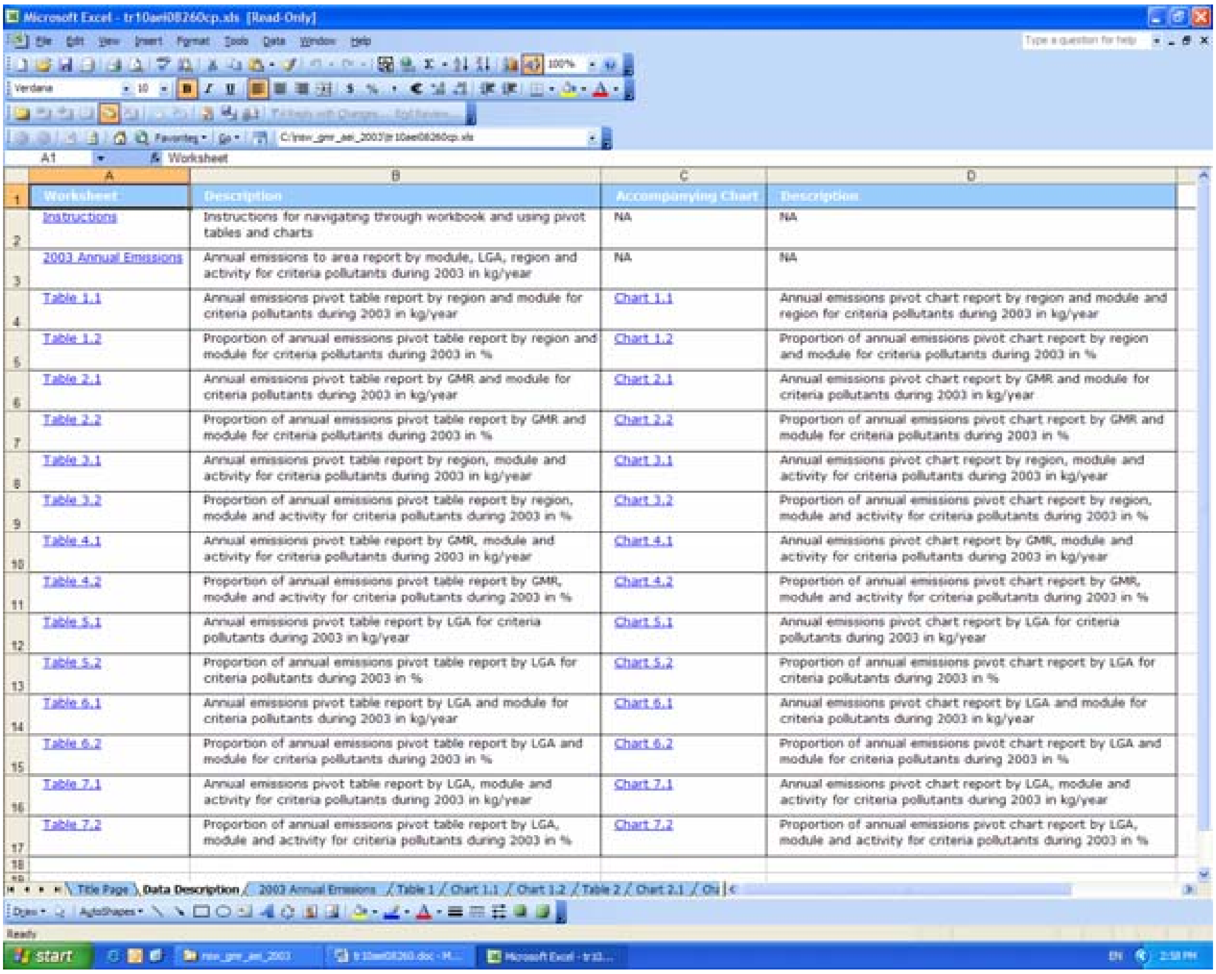
2.3.1 Excel Workbook Structure

The Excel™ workbook is based on an Emissions to Area Report for the GMR in 2003 that has been extracted from the Emissions Data Management System (EDMS v1.0) (DECC, 2008).

The Excel™ workbook contains a "Data Description" worksheet that includes in-built or macro hyperlinks to the following:

- Instructions: These instructions
- 2003 Annual Emissions: Emissions to Area Report for the GMR in 2003
- Table x.x: 14 Interactive pivot table reports
- Chart x.x: 14 Interactive pivot chart reports

The contents of the Excel™ workbook can be viewed by left mouse button clicking on the "Data Description" worksheet tab as shown in Figure 2.11.



Worksheet	Description	Accompanying Chart	Description
Instructions	Instructions for navigating through workbook and using pivot tables and charts	NA	NA
2003 Annual Emissions	Annual emissions to area report by module, LGA, region and activity for criteria pollutants during 2003 in kg/year	NA	NA
Table 1.1	Annual emissions pivot table report by region and module for criteria pollutants during 2003 in kg/year	Chart 1.1	Annual emissions pivot chart report by region and module and region for criteria pollutants during 2003 in kg/year
Table 1.2	Proportion of annual emissions pivot table report by region and module for criteria pollutants during 2003 in %	Chart 1.2	Proportion of annual emissions pivot chart report by region and module for criteria pollutants during 2003 in %
Table 2.1	Annual emissions pivot table report by GMR and module for criteria pollutants during 2003 in kg/year	Chart 2.1	Annual emissions pivot chart report by GMR and module for criteria pollutants during 2003 in kg/year
Table 2.2	Proportion of annual emissions pivot table report by GMR and module for criteria pollutants during 2003 in %	Chart 2.2	Proportion of annual emissions pivot chart report by GMR and module for criteria pollutants during 2003 in %
Table 3.1	Annual emissions pivot table report by region, module and activity for criteria pollutants during 2003 in kg/year	Chart 3.1	Annual emissions pivot chart report by region, module and activity for criteria pollutants during 2003 in kg/year
Table 3.2	Proportion of annual emissions pivot table report by region, module and activity for criteria pollutants during 2003 in %	Chart 3.2	Proportion of annual emissions pivot chart report by region, module and activity for criteria pollutants during 2003 in %
Table 4.1	Annual emissions pivot table report by GMR, module and activity for criteria pollutants during 2003 in kg/year	Chart 4.1	Annual emissions pivot chart report by GMR, module and activity for criteria pollutants during 2003 in kg/year
Table 4.2	Proportion of annual emissions pivot table report by GMR, module and activity for criteria pollutants during 2003 in %	Chart 4.2	Proportion of annual emissions pivot chart report by GMR, module and activity for criteria pollutants during 2003 in %
Table 5.1	Annual emissions pivot table report by LGA for criteria pollutants during 2003 in kg/year	Chart 5.1	Annual emissions pivot chart report by LGA for criteria pollutants during 2003 in kg/year
Table 5.2	Proportion of annual emissions pivot table report by LGA for criteria pollutants during 2003 in %	Chart 5.2	Proportion of annual emissions pivot chart report by LGA for criteria pollutants during 2003 in %
Table 6.1	Annual emissions pivot table report by LGA and module for criteria pollutants during 2003 in kg/year	Chart 6.1	Annual emissions pivot chart report by LGA and module for criteria pollutants during 2003 in kg/year
Table 6.2	Proportion of annual emissions pivot table report by LGA and module for criteria pollutants during 2003 in %	Chart 6.2	Proportion of annual emissions pivot chart report by LGA and module for criteria pollutants during 2003 in %
Table 7.1	Annual emissions pivot table report by LGA, module and activity for criteria pollutants during 2003 in kg/year	Chart 7.1	Annual emissions pivot chart report by LGA, module and activity for criteria pollutants during 2003 in kg/year
Table 7.2	Proportion of annual emissions pivot table report by LGA, module and activity for criteria pollutants during 2003 in %	Chart 7.2	Proportion of annual emissions pivot chart report by LGA, module and activity for criteria pollutants during 2003 in %

Figure 2.11 Select "Data Description" Worksheet

2.3.2 Using Built-In Hyperlinks and Macros

To assist in navigating the Excel™ workbook, you may need to switch on the “Web” toolbar. To switch on the “Web” toolbar, select “View”, “Toolbars” and “Web” from the command menu as shown in Figure 2.12.

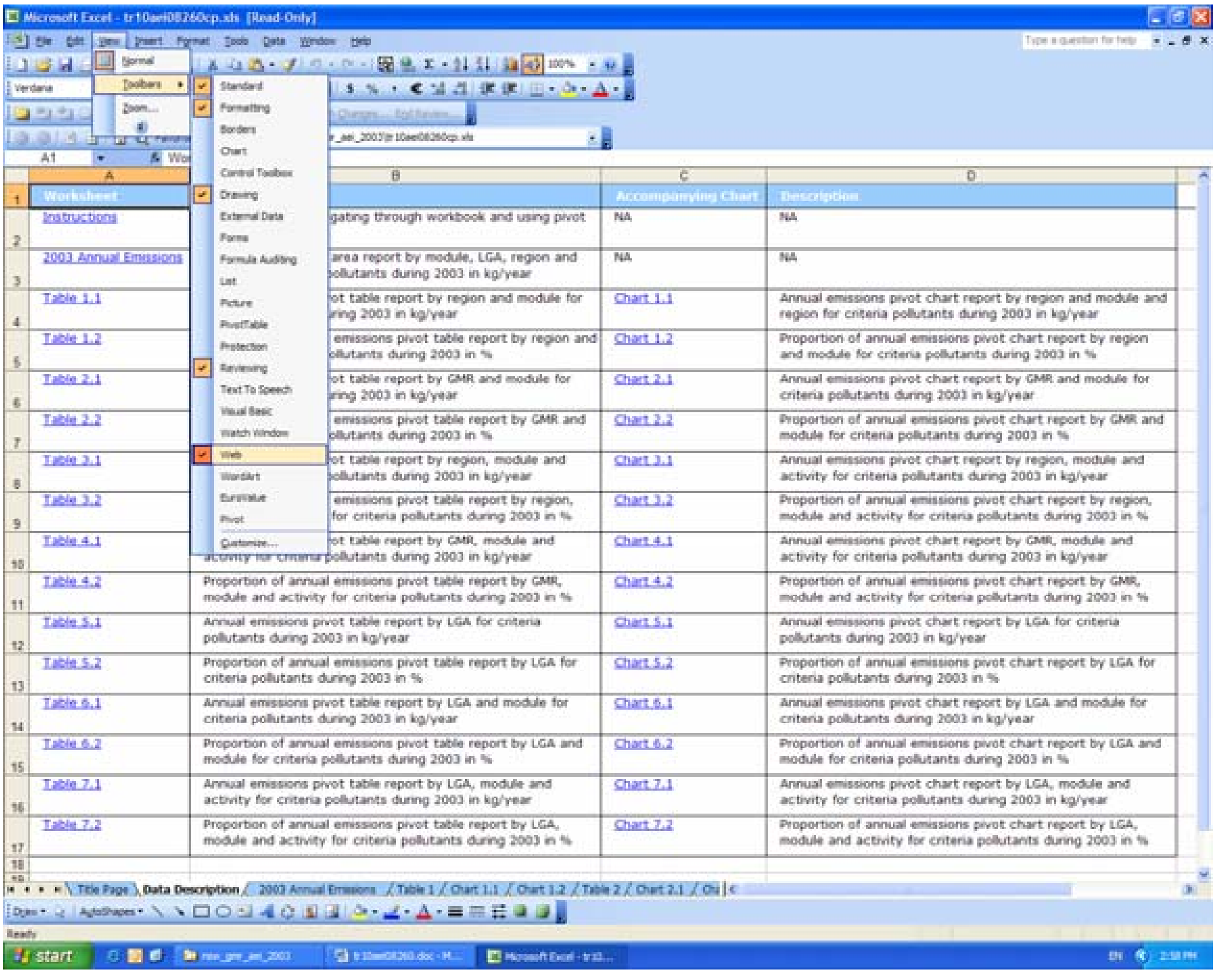


Figure 2.12 Select “Web” Toolbar

To select a table, left mouse button click the "Data Description" worksheet tab, move to the cell required and left mouse button click the built-in hyperlink. An example selection for Table 1.1 is shown in Figure 2.13.

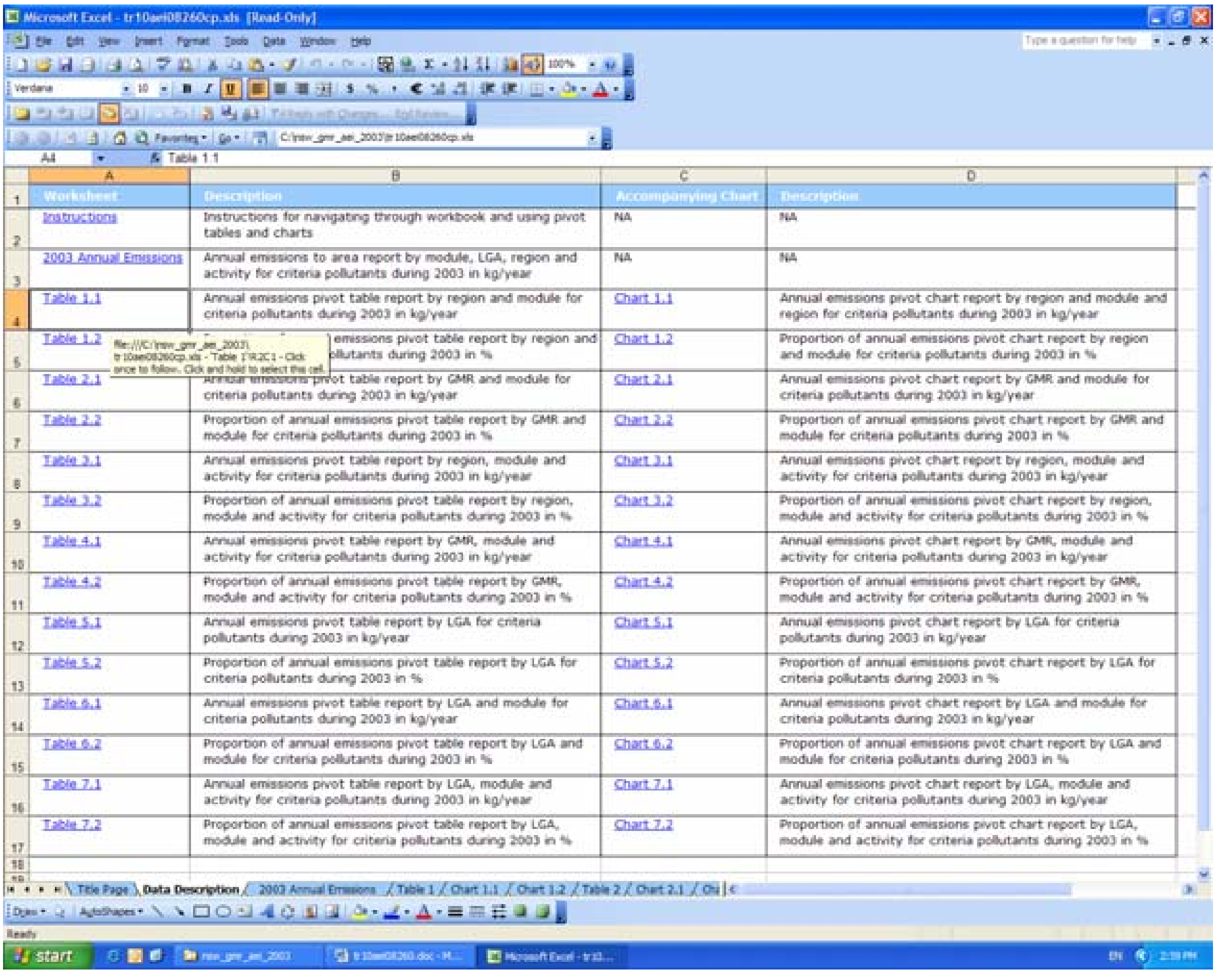


Figure 2.13 Select "Table 1.1"

To go back to the “Data Description” worksheet, left mouse button click the “back” web toolbar as shown in Figure 2.14.

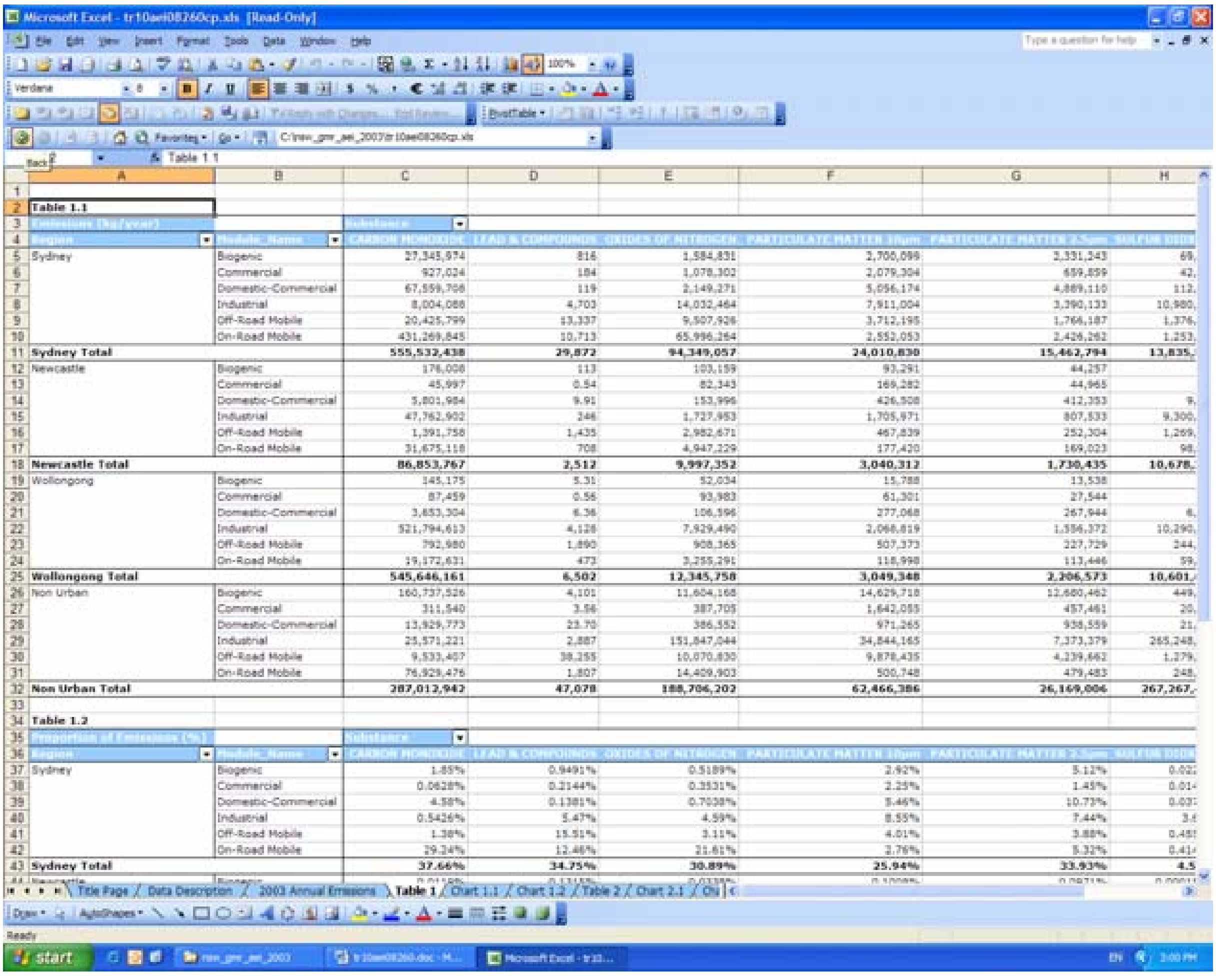


Figure 2.14 Go Back using “Web” Toolbar

To select a chart, left mouse button click the "Data Description" worksheet tab, either move to the cell required or left mouse button click the macro hyperlink. An example selection for Chart 1.1 is shown in Figure 2.15.

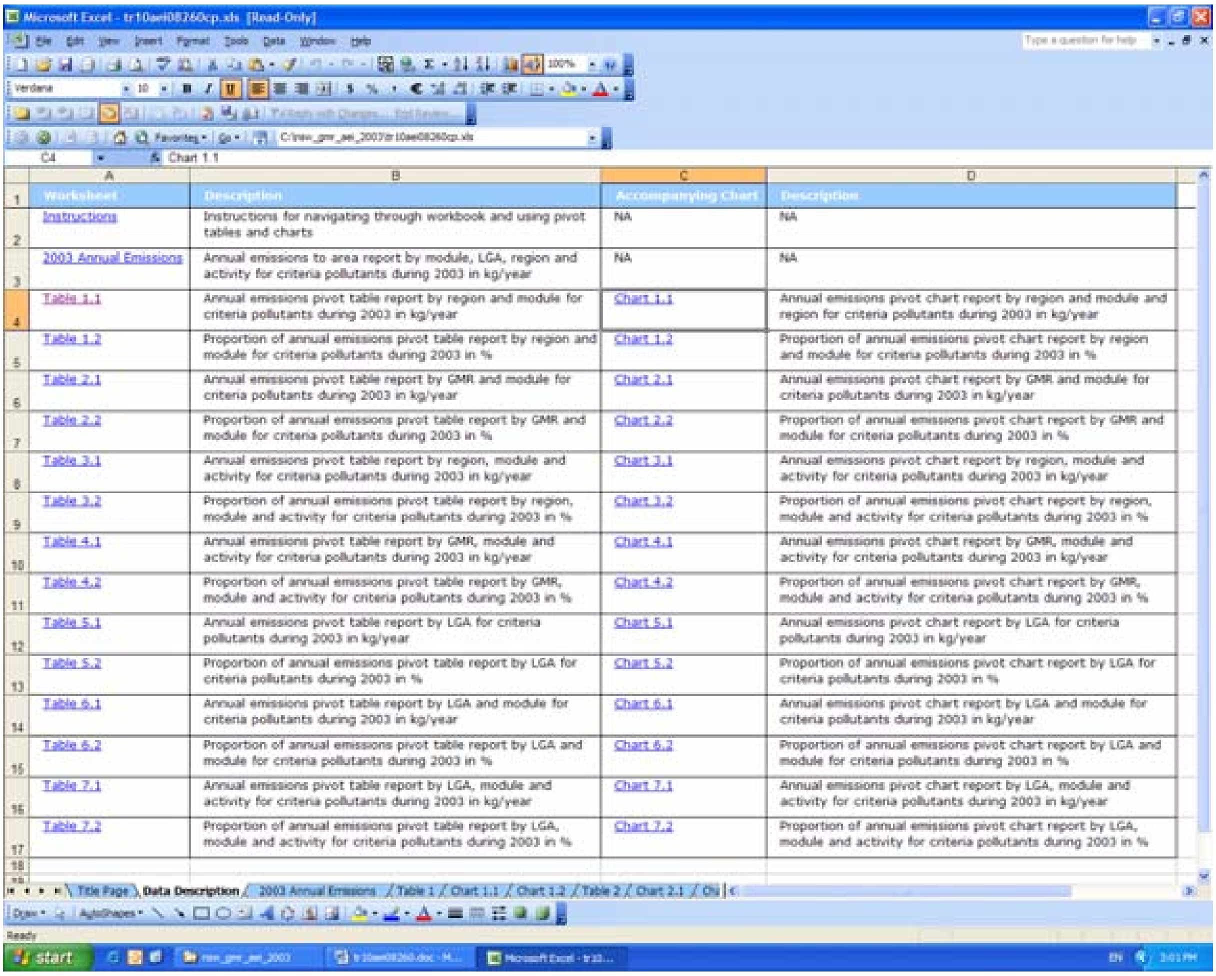


Figure 2.15 Select "Chart 1.1"

To go back to the "Data Description" worksheet, left mouse button click the "Data Description" worksheet tab as shown in Figure 2.16.

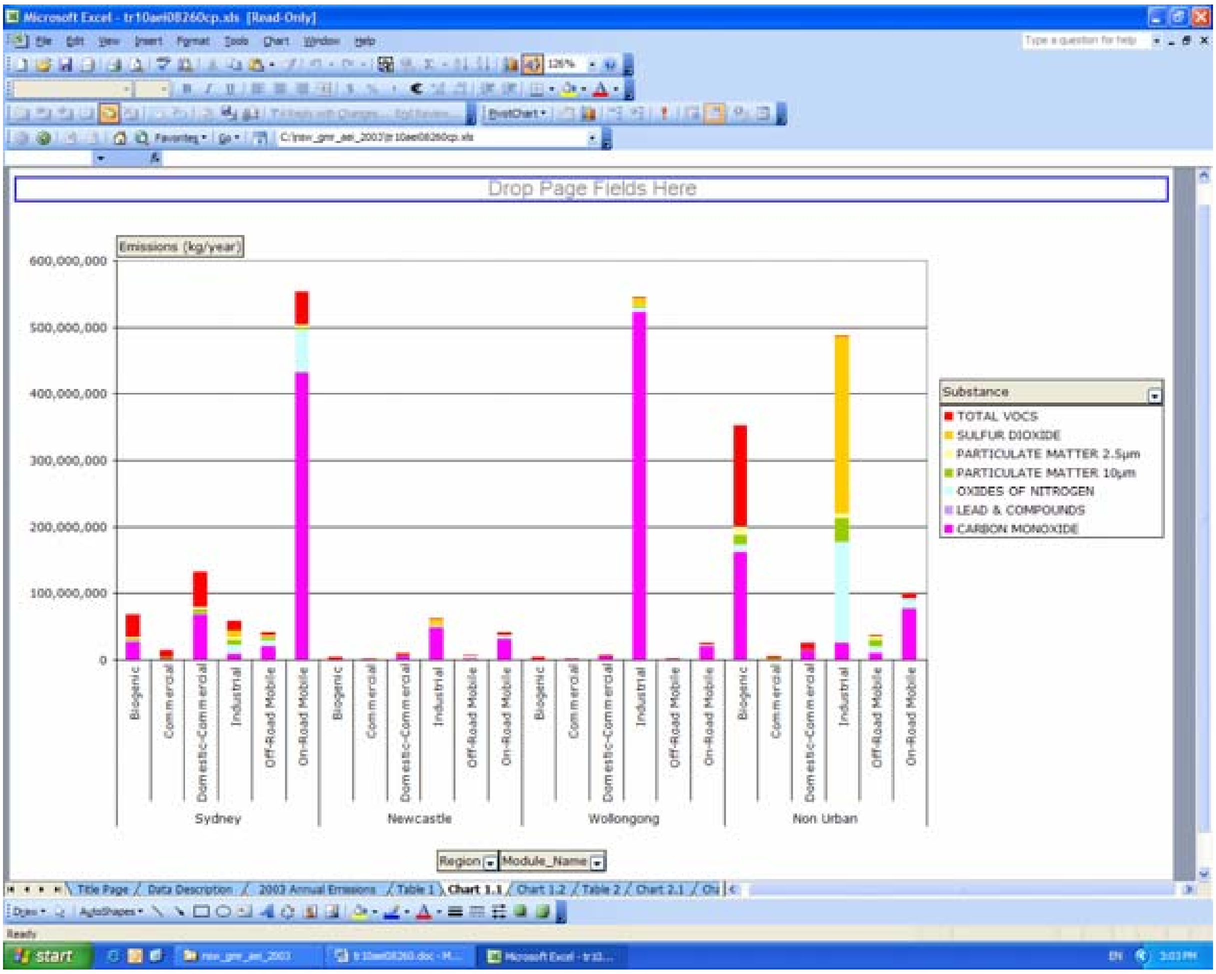


Figure 2.16 Go Back using "Data Description" Worksheet Tab

2.3.3 Using Worksheet Tabs

Rather than using the in-built or macro hyperlinks to navigate the Excel™ workbook, you may choose to left mouse button click on any of the worksheet tabs instead to access the relevant information.

2.4 Using and Interpreting Existing Pivot Table Reports

2.4.1 Example 1 – Using Pivot Table Reports

Example 1 investigates the use of Table 7.1 in the Excel™ workbook. Table 7.1 contains an annual emissions pivot table report by LGA, module and activity during 2003 in kg/year. Start by navigating to the "Table 7.1" worksheet using any of the methods described previously as shown in Figure 2.17.

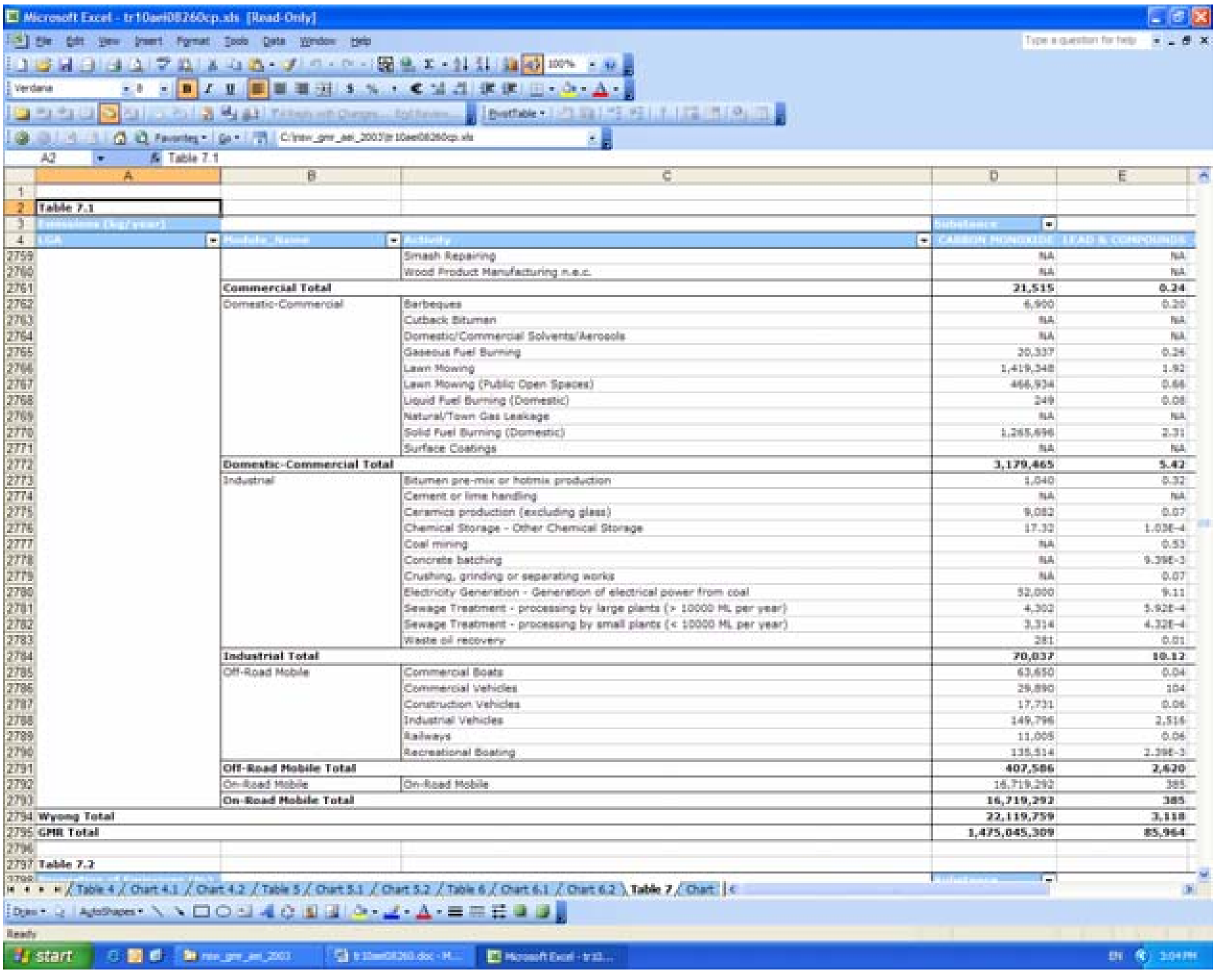


Figure 2.17 Example 1 - Navigate to "Table 7.1" Worksheet

The pivot table contains drop-down menus that allow you to make the following selections:

- Local Government Area (LGA) (e.g. Ashfield)
- Module_Name (i.e. Biogenic, Commercial, Domestic-Commercial, Industrial, Off-Road Mobile and On-Road Mobile)
- Activity (e.g. Automotive Fuel Retailing)
- Substance (e.g. CARBON MONOXIDE)

In Example 1, the following selections have been made using the drop-down menus:

- LGA - Ashfield
- Module_Name - All
- Activity - All
- Substance – TOTAL VOCS

The steps required to do this are described below:

- **Step 1** – Select the "LGA" drop-down menu, uncheck the "(Show All)" box and check the "Ashfield" box as shown in Figure 2.18

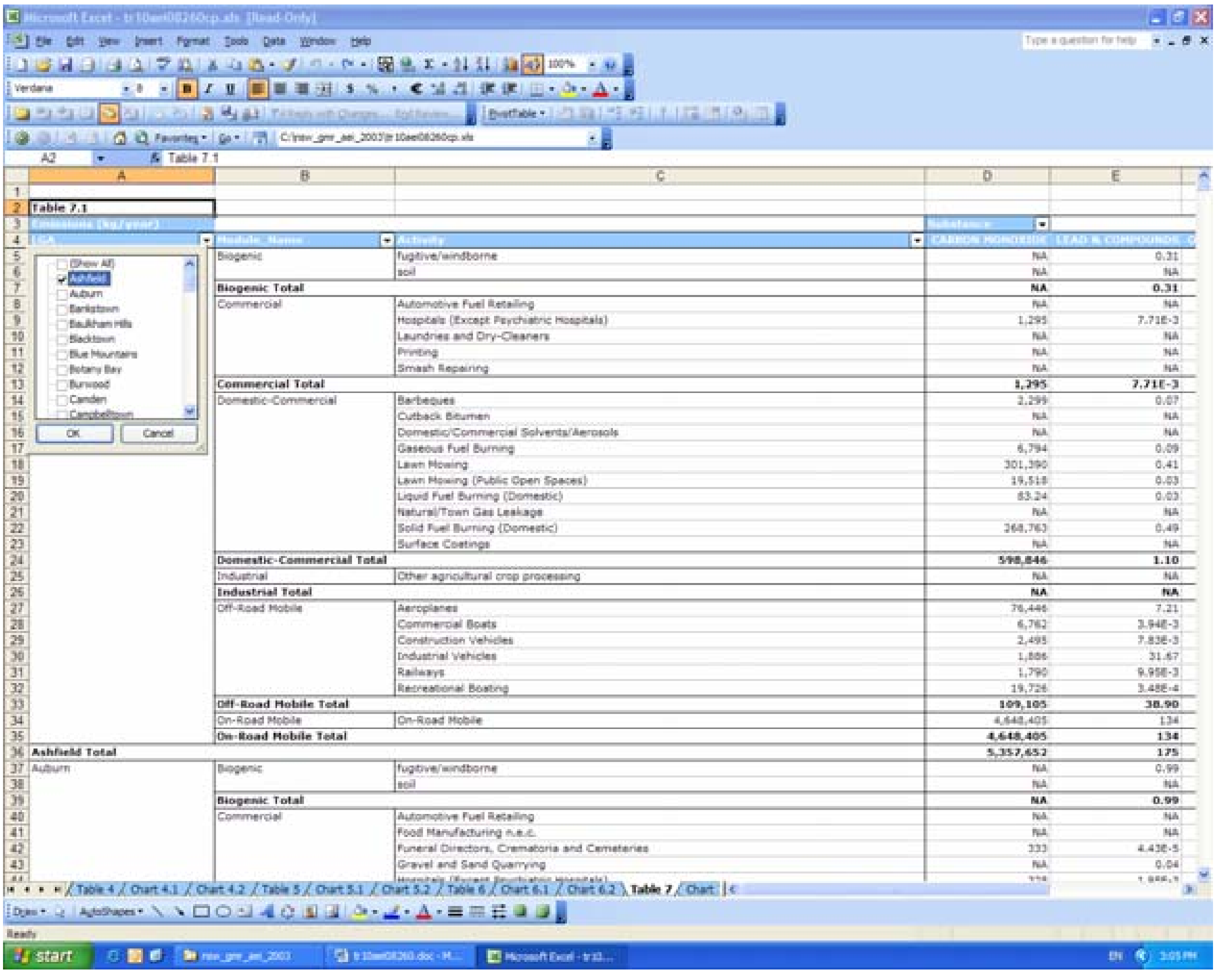


Figure 2.18 Example 1 - Select "LGA"

- **Step 2** – Select the "Module_Name" drop-down menu – No selections are required because all are checked by default
- **Step 3** – Select the "Activity" drop-down menu - No selections are required because all are checked by default

- **Step 4** - Select the “Substance” drop-down menu, uncheck the “(Show All)” box and check the “TOTAL VOCS” box as shown in Figure 2.19

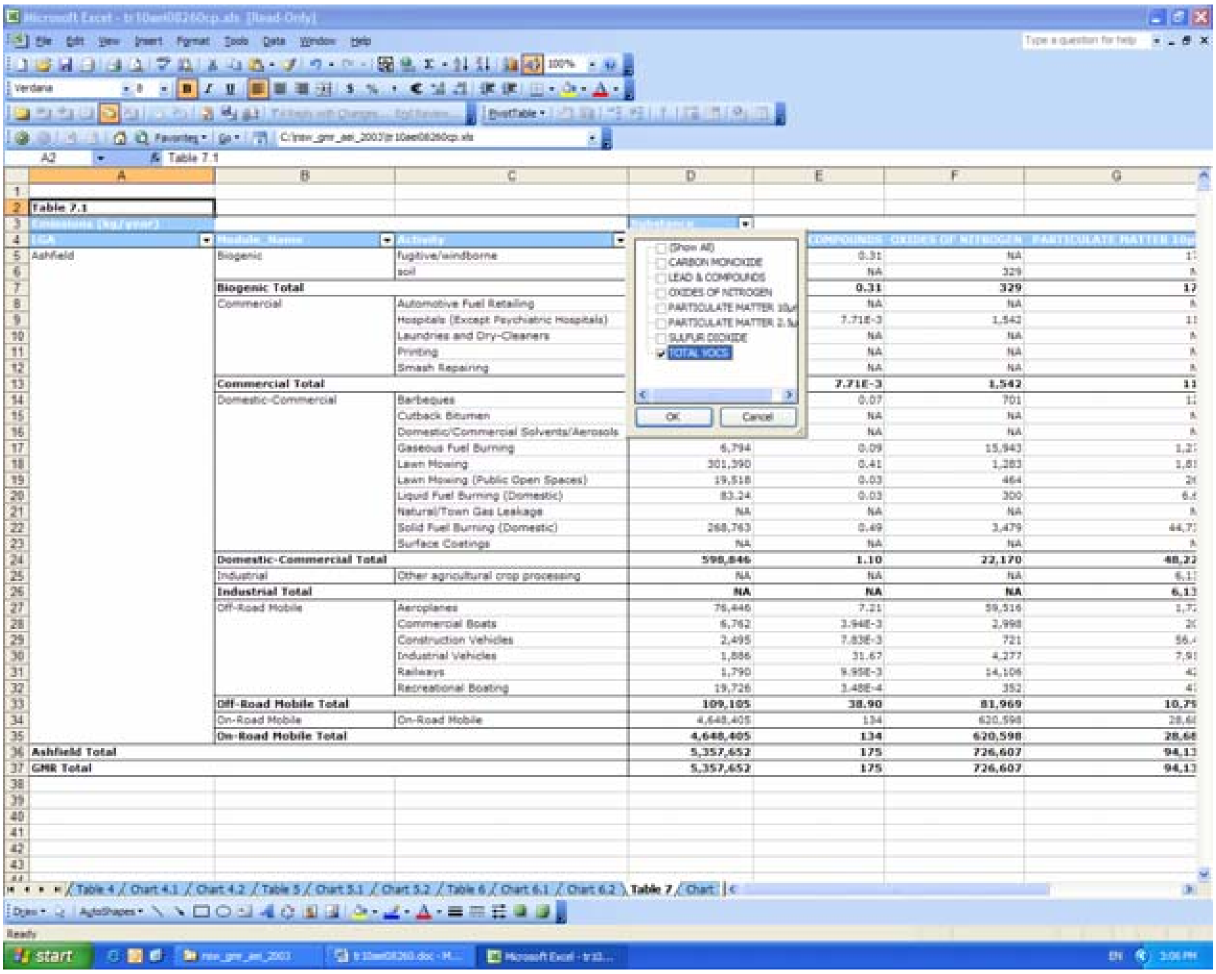


Figure 2.19 Example 1 - Select “Substance”

After making these selections, the Example 1 pivot table report will look like that shown in Figure 2.20.

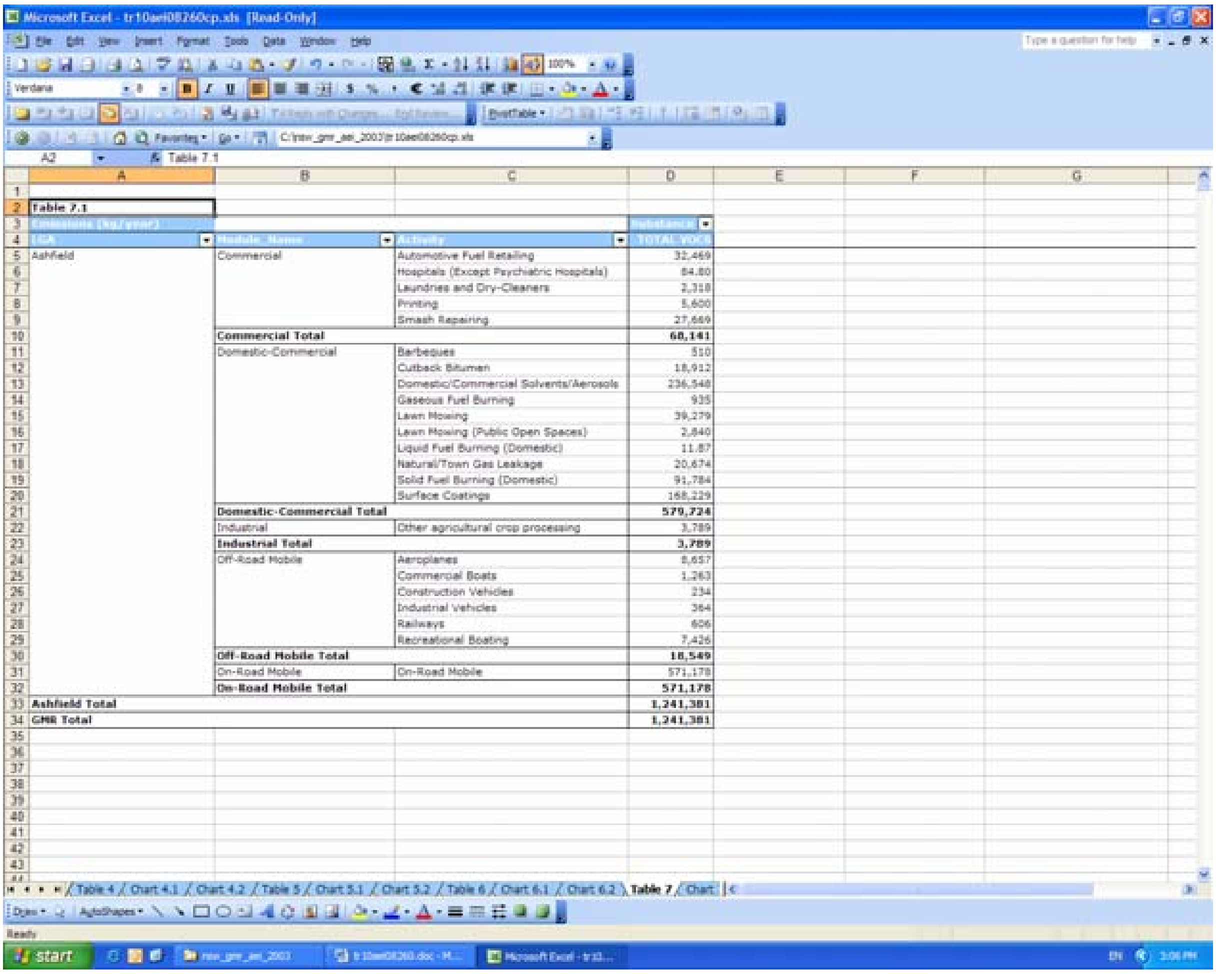


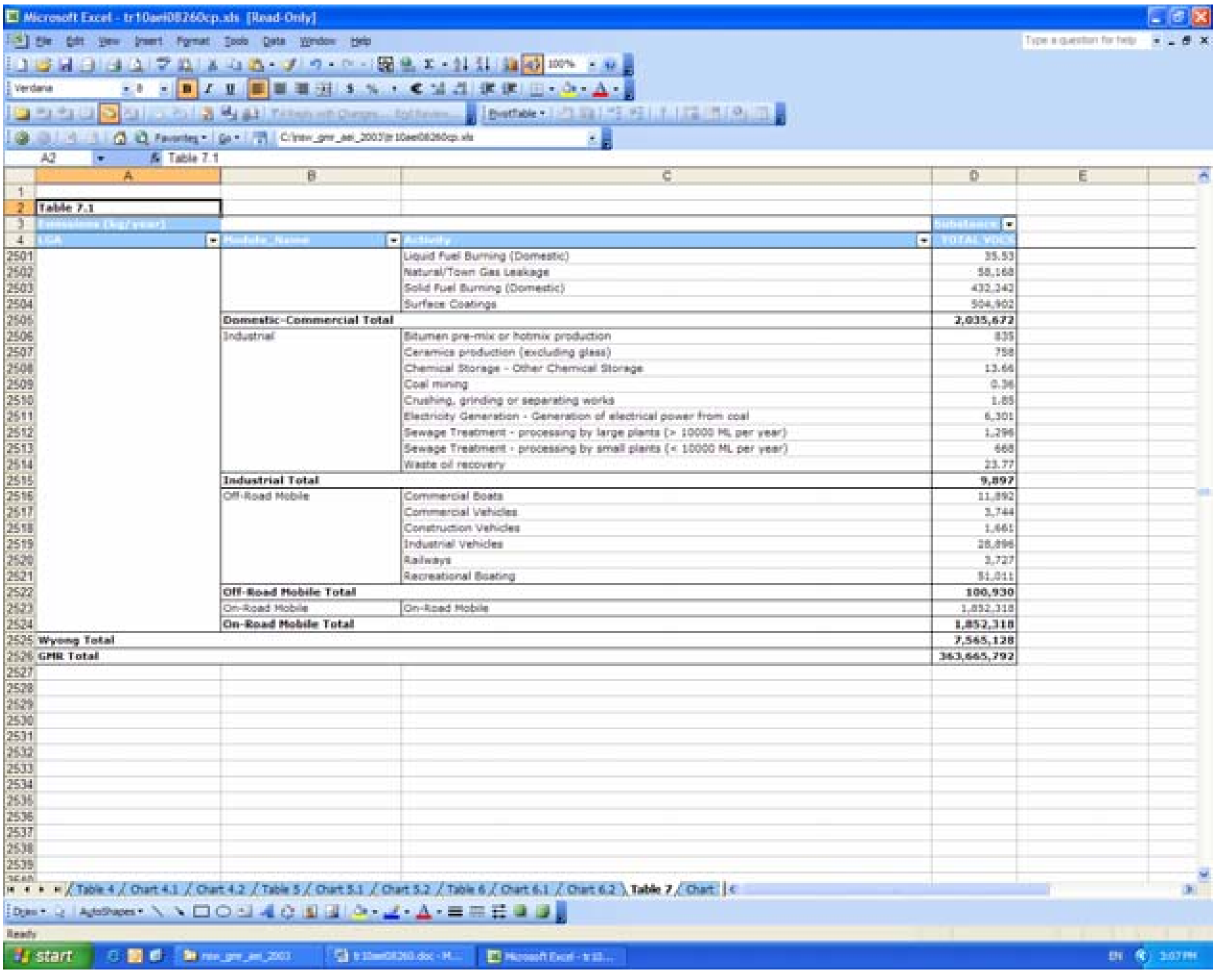
Table 7.1

Emissions (kg/year)			Substance
LGA	Module_Name	Activity	TOTAL VOCS
Ashfield	Commercial	Automotive Fuel Retailing	32,469
		Hospitals (Except Psychiatric Hospitals)	84.80
		Laundries and Dry-Cleaners	2,318
		Printing	5,600
		Smash Repairing	27,669
	Commercial Total		**68,141**
	Domestic-Commercial	Barbeques	510
		Cutback Bitumen	18,912
		Domestic/Commercial Solvents/Aerosols	236,548
		Gaseous Fuel Burning	935
		Lawn Mowing	39,279
		Lawn Mowing (Public Open Spaces)	2,840
		Liquid Fuel Burning (Domestic)	11.87
		Natural/Town Gas Leakage	20,674
		Solid Fuel Burning (Domestic)	91,784
		Surface Coatings	168,229
	Domestic-Commercial Total		**579,724**
	Industrial	Other agricultural crop processing	3,789
	Industrial Total		**3,789**
	Off-Road Mobile	Aeroplanes	8,657
		Commercial Boats	1,263
		Construction Vehicles	234
		Industrial Vehicles	364
		Railways	606
		Recreational Boating	7,426
	Off-Road Mobile Total		**18,549**
	On-Road Mobile	On-Road Mobile	571,178
	On-Road Mobile Total		**571,178**
Ashfield Total			**1,241,381**
GMR Total			**1,241,381**

Figure 2.20 Example 1 - Pivot Table Report

You should note that Chart 7.1 is based on Table 7.1, so the information presented in the chart will also be modified according to these selections. Refer to Example 4 (Section 2.6.1), which shows the accompanying changes to the chart.

You should exercise care when interpreting the results of the pivot table report. In Example 1 (Section 2.4.1), the value "GMR Total" is in fact the total for the selection being made. If all LGAs are selected, the TOTAL VOCS emissions would be 363,665,792 kg/year as shown in Figure 2.21, rather than 1,241,381 kg/year if Ashfield were selected as shown in Figure 2.20.



	LGA	Module_Name	Activity	TOTAL VOCs
2	Table 7.1			
3	Emissions (kg/year)			Substance
4	LGA	Module_Name	Activity	TOTAL VOCs
2501			Liquid Fuel Burning (Domestic)	35.53
2502			Natural/Town Gas Leakage	58,168
2503			Solid Fuel Burning (Domestic)	432,242
2504			Surface Coatings	504,902
2505		**Domestic-Commercial Total**		**2,035,672**
2506		Industrial	Bitumen pre-mix or hotmix production	835
2507			Ceramics production (excluding glass)	758
2508			Chemical Storage - Other Chemical Storage	13.66
2509			Coal mining	0.36
2510			Crushing, grinding or separating works	1.85
2511			Electricity Generation - Generation of electrical power from coal	6,301
2512			Sewage Treatment - processing by large plants (> 10000 ML per year)	1,296
2513			Sewage Treatment - processing by small plants (< 10000 ML per year)	668
2514			Waste oil recovery	23.77
2515		**Industrial Total**		**9,897**
2516		Off-Road Mobile	Commercial Boats	11,892
2517			Commercial Vehicles	3,744
2518			Construction Vehicles	1,661
2519			Industrial Vehicles	28,896
2520			Railways	3,727
2521			Recreational Boating	51,011
2522		**Off-Road Mobile Total**		**100,930**
2523		On-Road Mobile	On-Road Mobile	1,852,318
2524		**On-Road Mobile Total**		**1,852,318**
2525	**Wyong Total**			**7,565,128**
2526	**GMR Total**			**363,665,792**

Figure 2.21 Example 1 - Pivot Table Report with all LGAs Selected

2.4.2 Example 2 – Interpreting Pivot Table Reports

Extra care should be exercised when interpreting the results of the pivot table reports that present emissions as a proportion of the total.

Example 2 investigates the use of Table 7.2 in the Excel™ workbook. Table 7.2 contains the proportion of annual emissions pivot table report by LGA, module and activity during 2003 in %. Start by navigating to the “Table 7.2” worksheet using any of the methods described previously and make the selections from the drop-down menus like Example 1 as shown in Figure 2.22.

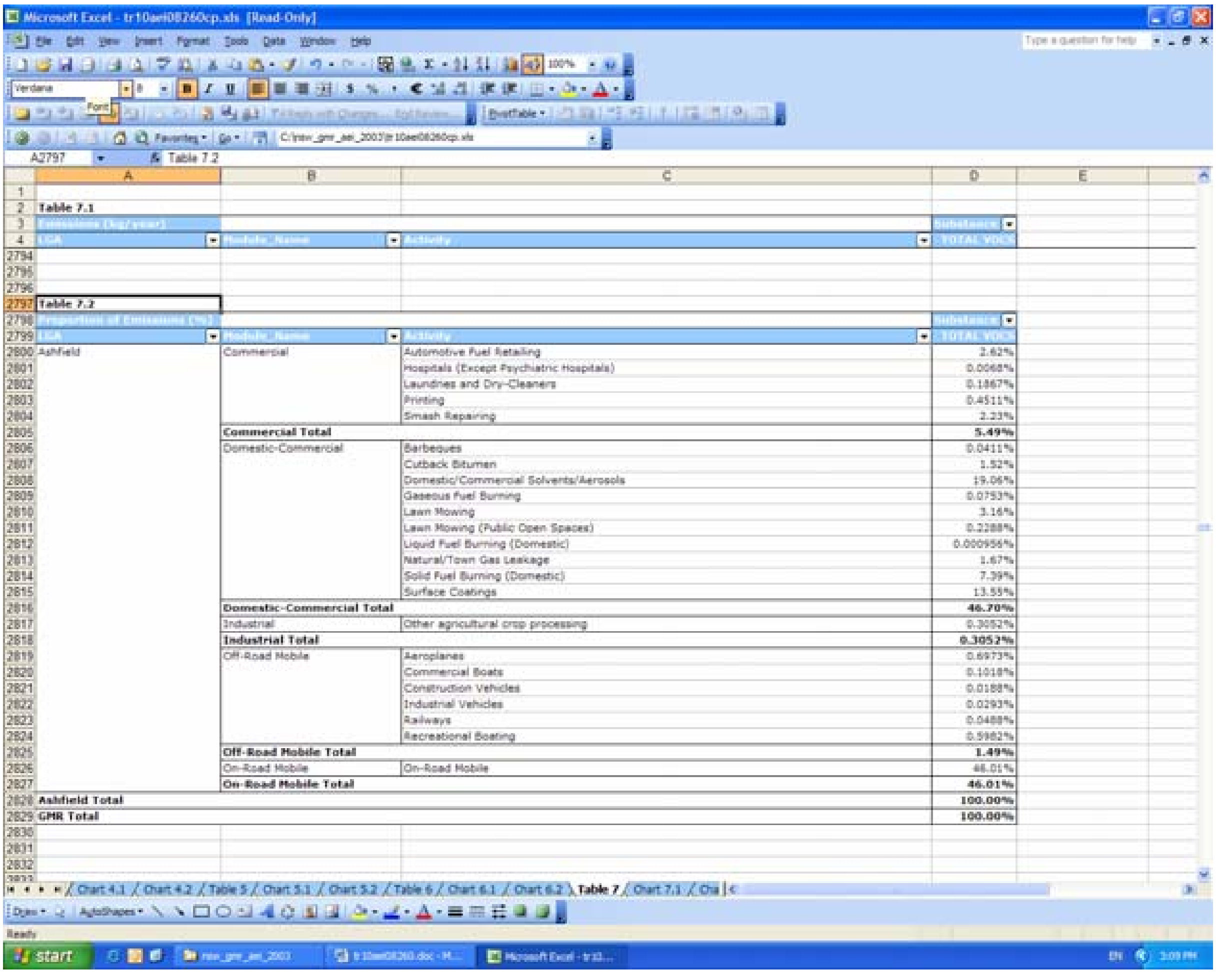


Table 7.2			
Proportion of Emissions (%)			Substance
LGA	Module_Name	Activity	TOTAL VOCs
Ashfield	Commercial	Automotive Fuel Retailing	2.62%
		Hospitals (Except Psychiatric Hospitals)	0.0068%
		Laundries and Dry-Cleaners	0.1867%
		Printing	0.4511%
		Smash Repairing	2.23%
	Commercial Total		**5.49%**
	Domestic-Commercial	Barbeques	0.0411%
		Cutback Bitumen	1.52%
		Domestic/Commercial Solvents/Aerosols	19.06%
		Gaseous Fuel Burning	0.0753%
		Lawn Mowing	3.16%
		Lawn Mowing (Public Open Spaces)	0.2288%
		Liquid Fuel Burning (Domestic)	0.000956%
		Natural/Town Gas Leakage	1.67%
		Solid Fuel Burning (Domestic)	7.39%
		Surface Coatings	13.55%
	Domestic-Commercial Total		**46.70%**
	Industrial	Other agricultural crop processing	0.3052%
	Industrial Total		**0.3052%**
	Off-Road Mobile	Aeroplanes	0.6973%
		Commercial Boats	0.1018%
		Construction Vehicles	0.0188%
		Industrial Vehicles	0.0293%
		Railways	0.0488%
		Recreational Boating	0.5982%
	Off-Road Mobile Total		**1.49%**
	On-Road Mobile	On-Road Mobile	46.01%
	On-Road Mobile Total		**46.01%**
Ashfield Total			**100.00%**
GMR Total			**100.00%**

Figure 2.22 Example 2 - Navigate to “Table 7.2” Worksheet

You will notice the Ashfield Total and GMR Total are both 100%, since only the Ashfield LGA has been selected as shown in Figure 2.22. All other proportions shown in the pivot table report are proportions of annual emissions in Ashfield LGA only. However, if all LGAs are selected, you will notice the Ashfield Total and GMR Total are 0.34 % and 100% respectively as shown in Figure 2.23. All other proportions shown in the pivot table report are proportions of annual emissions in all LGAs (i.e. GMR).

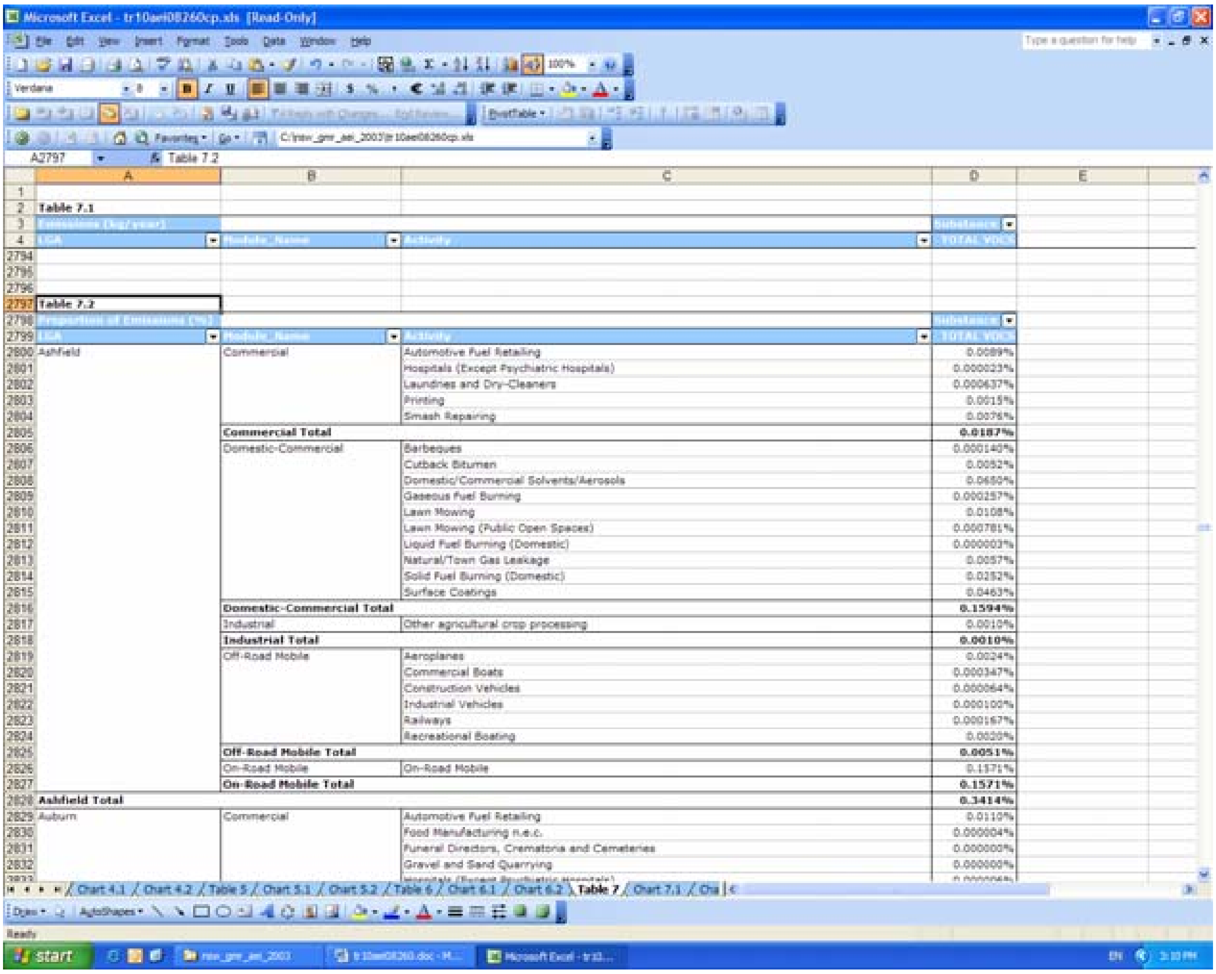


Table 7.2

Proportion of Emissions (%)			Substance
LGA	Module_Name	Activity	TOTAL VOCs
Ashfield	Commercial	Automotive Fuel Retailing	0.0089%
		Hospitals (Except Psychiatric Hospitals)	0.000023%
		Laundries and Dry-Cleaners	0.000637%
		Printing	0.0015%
		Smash Repairing	0.0076%
	Commercial Total		**0.0187%**
	Domestic-Commercial	Barbeques	0.000140%
		Cutback Bitumen	0.0052%
		Domestic/Commercial Solvents/Aerosols	0.0650%
		Gaseous Fuel Burning	0.000257%
		Lawn Mowing	0.0108%
		Lawn Mowing (Public Open Spaces)	0.000781%
		Liquid Fuel Burning (Domestic)	0.000003%
		Natural/Town Gas Leakage	0.0057%
		Solid Fuel Burning (Domestic)	0.0252%
		Surface Coatings	0.0463%
	Domestic-Commercial Total		**0.1594%**
	Industrial	Other agricultural crop processing	0.0010%
	Industrial Total		**0.0010%**
	Off-Road Mobile	Aeroplanes	0.0024%
		Commercial Boats	0.000347%
		Construction Vehicles	0.000064%
		Industrial Vehicles	0.000100%
		Railways	0.000167%
		Recreational Boating	0.0020%
	Off-Road Mobile Total		**0.0051%**
	On-Road Mobile	On-Road Mobile	0.1571%
	On-Road Mobile Total		**0.1571%**
Ashfield Total			**0.3414%**
Auburn	Commercial	Automotive Fuel Retailing	0.0110%
		Food Manufacturing n.e.c.	0.000004%
		Funeral Directors, Crematoria and Cemeteries	0.000000%
		Gravel and Sand Quarrying	0.000000%

Figure 2.23 Example 2 - Pivot Table Report with all LGAs Selected

2.5 Creating New Pivot Table Reports

2.5.1 Example 3 – Creating Pivot Table Reports

Example 3 describes the steps required to create a pivot table report. Specifically, Table 1.1 in the Excel™ workbook will be created from first principals. Table 1.1 contains the annual emissions pivot table report by region and module during 2003 in kg/year.

The steps required to do this are described below:

- **Step 1** – Navigate to the "2003 Annual Emissions" worksheet as shown in Figure 2.24

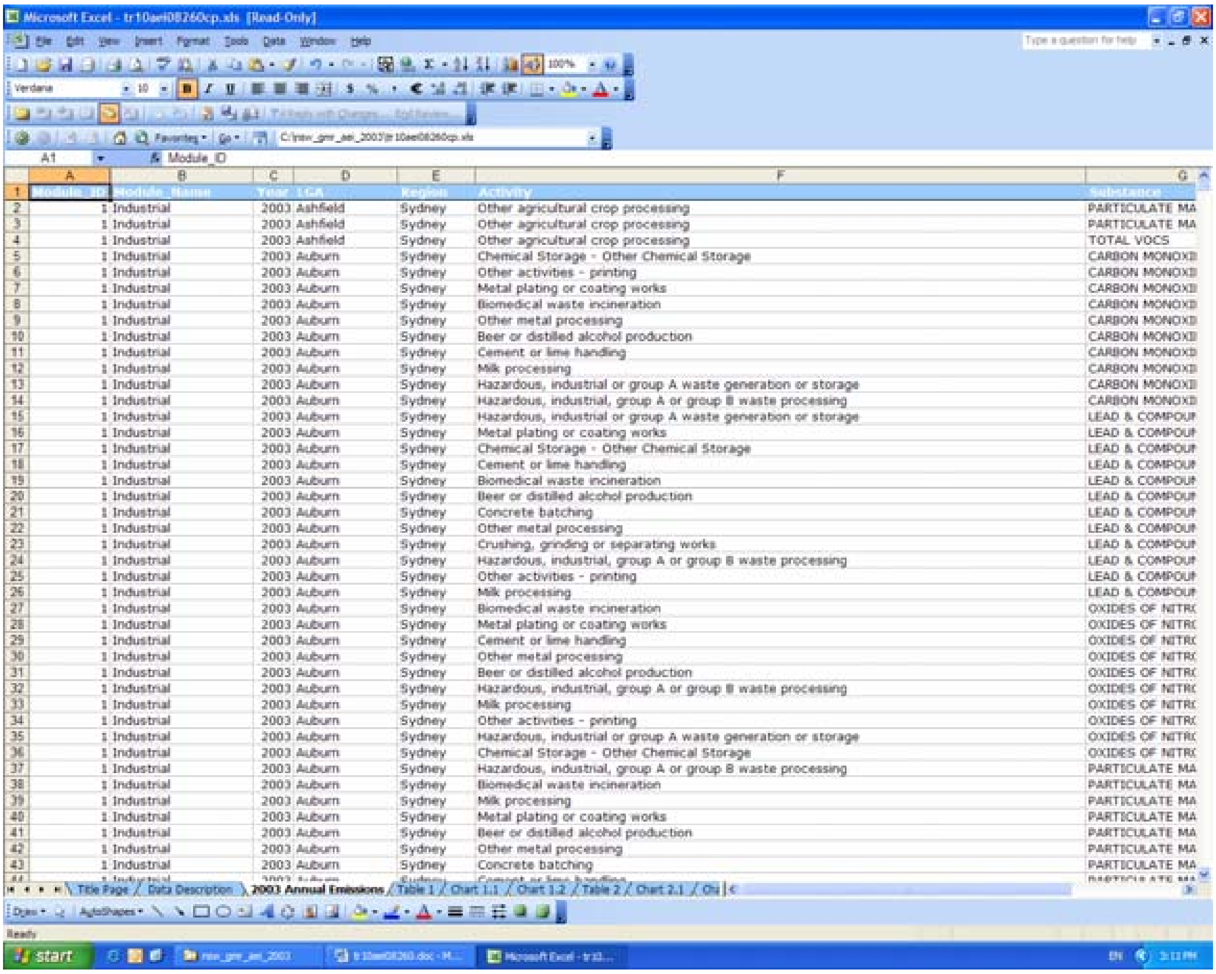


Figure 2.24 Example 3 – Navigate to "2003 Annual Emissions" Worksheet

- **Step 2** - Select "Data" and "PivotTable and PivotChart Report" from the command menu as shown in Figure 2.25

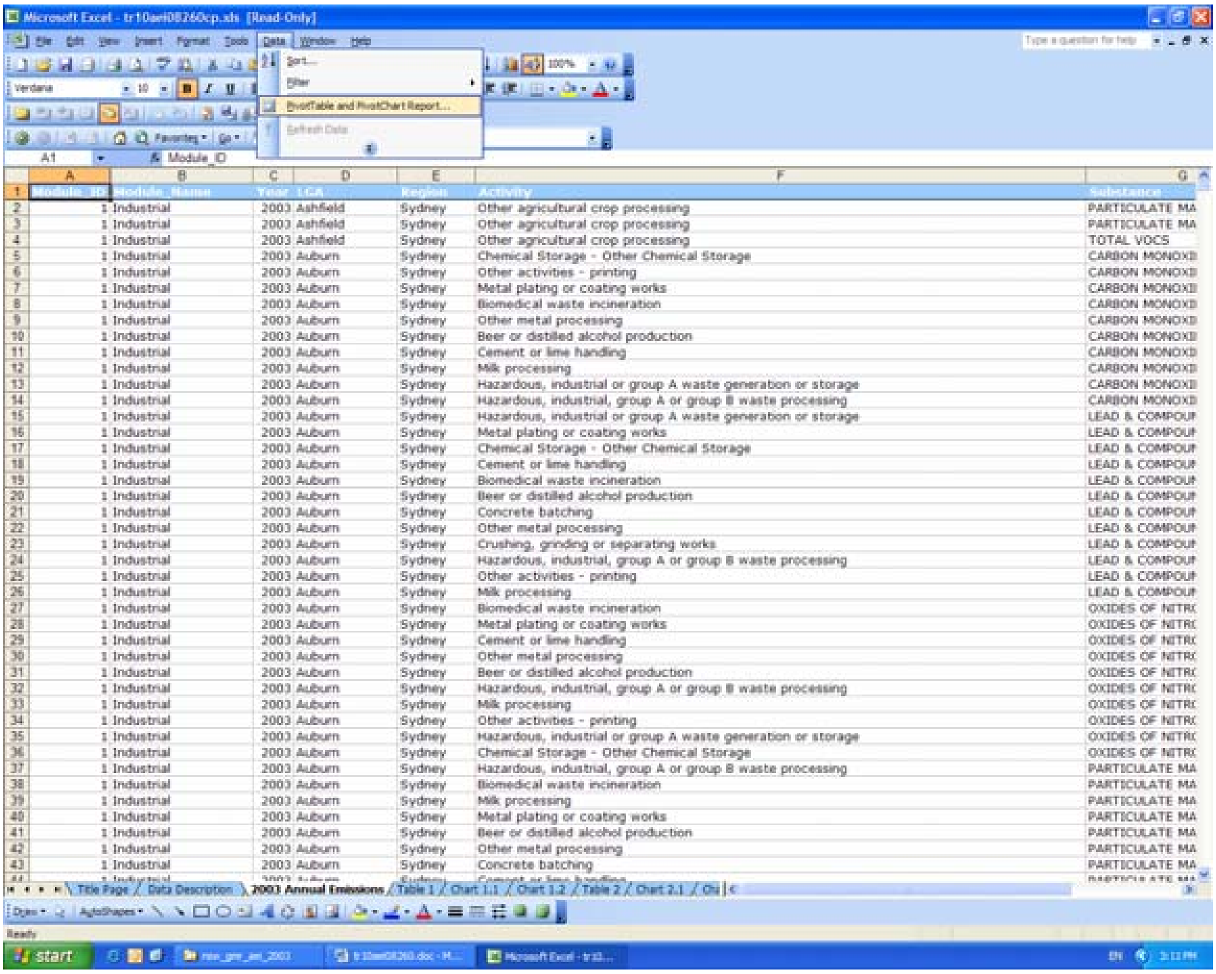


Figure 2.25 Example 3 – Select "Data" and "PivotTable and PivotChart Report"

- **Step 3** – Select the "Microsoft Office Excel list or database" and "PivotTable" radio buttons as shown in Figure 2.26 and then select the "Next" button. You may also select the "PivotChart Report (with PivotTable report)" radio button at this point and complete both tasks at the same time. However, the steps required for creating a pivot chart report alone from a pivot table are separately discussed in Section 2.7

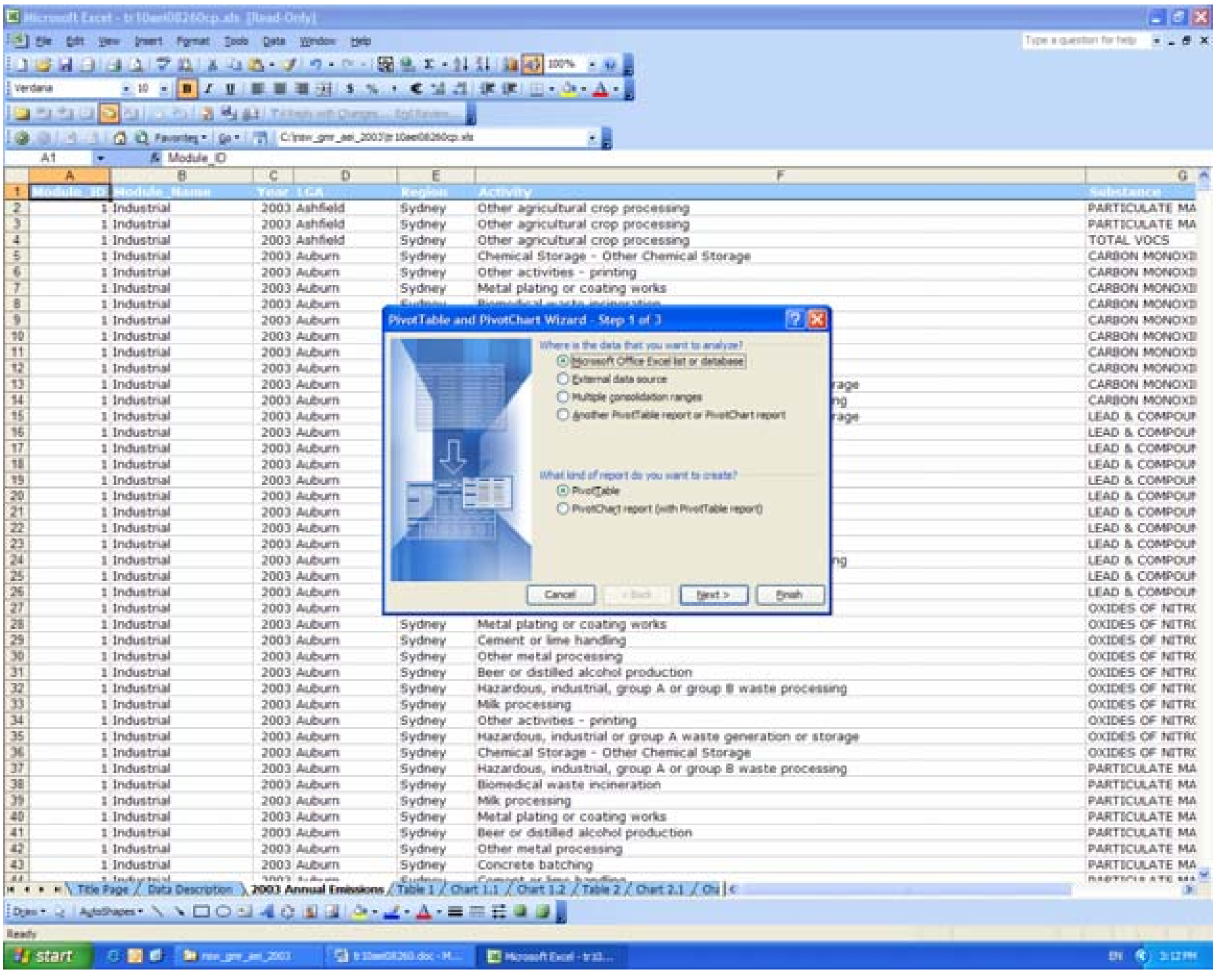


Figure 2.26 Example 3 – Select "Microsoft Office Excel list or database" and "PivotTable"

- **Step 4** – Select the "<u>R</u>ange" of data according to the prompt "Where is the data that you want to use" as shown in Figure 2.27 and then select the "<u>N</u>ext" button

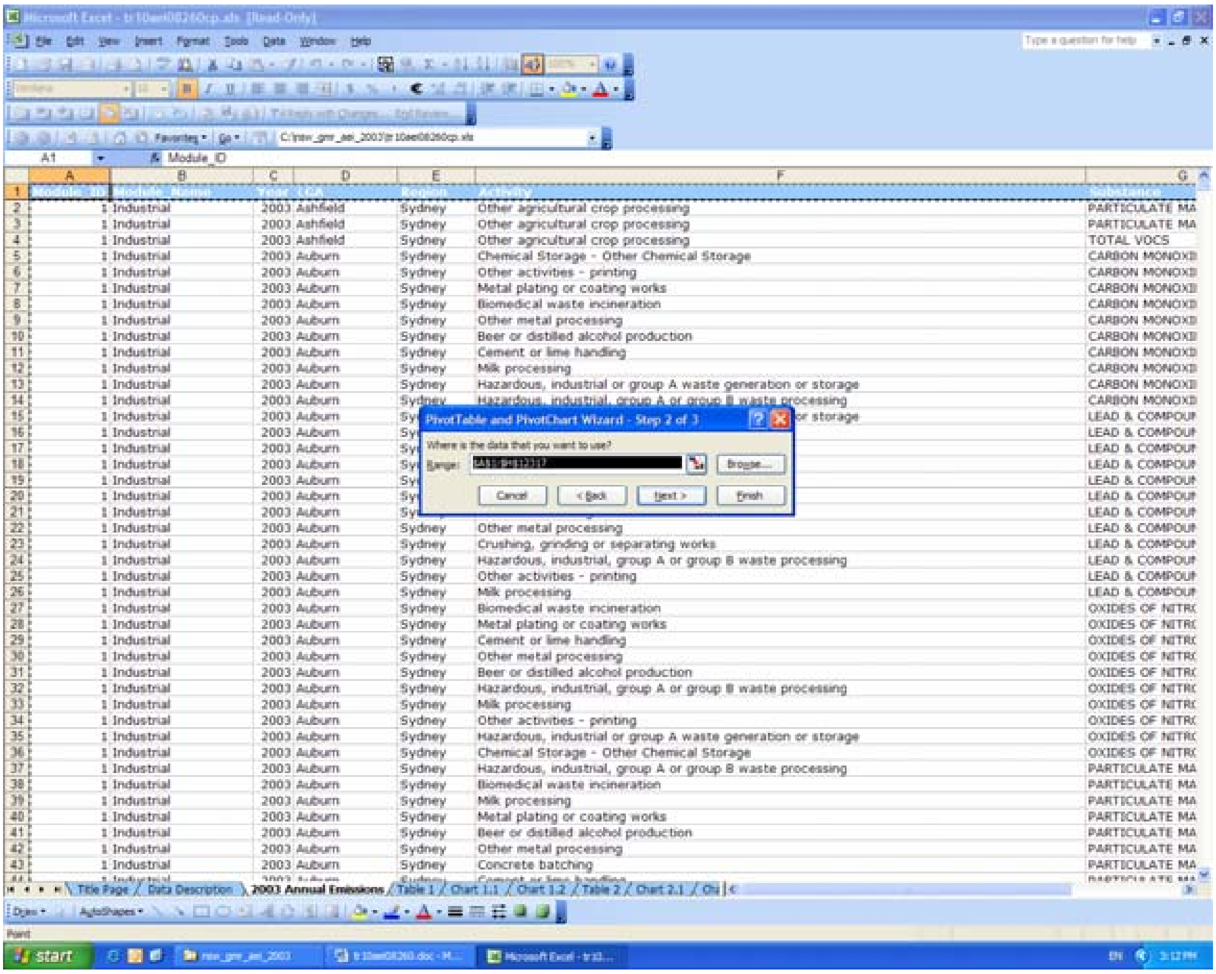


Figure 2.27 Example 3 – Select "<u>R</u>ange"

- **Step 5** – Select whether you would like to base the new pivot table report on an existing pivot table report or not. If the primary data source of both pivot tables is the same, it is preferable to select the "Yes" button so the Excel™ workbook will take up less disk space. In this example, the "No" button has been selected to simplify the number of steps as shown in Figure 2.28

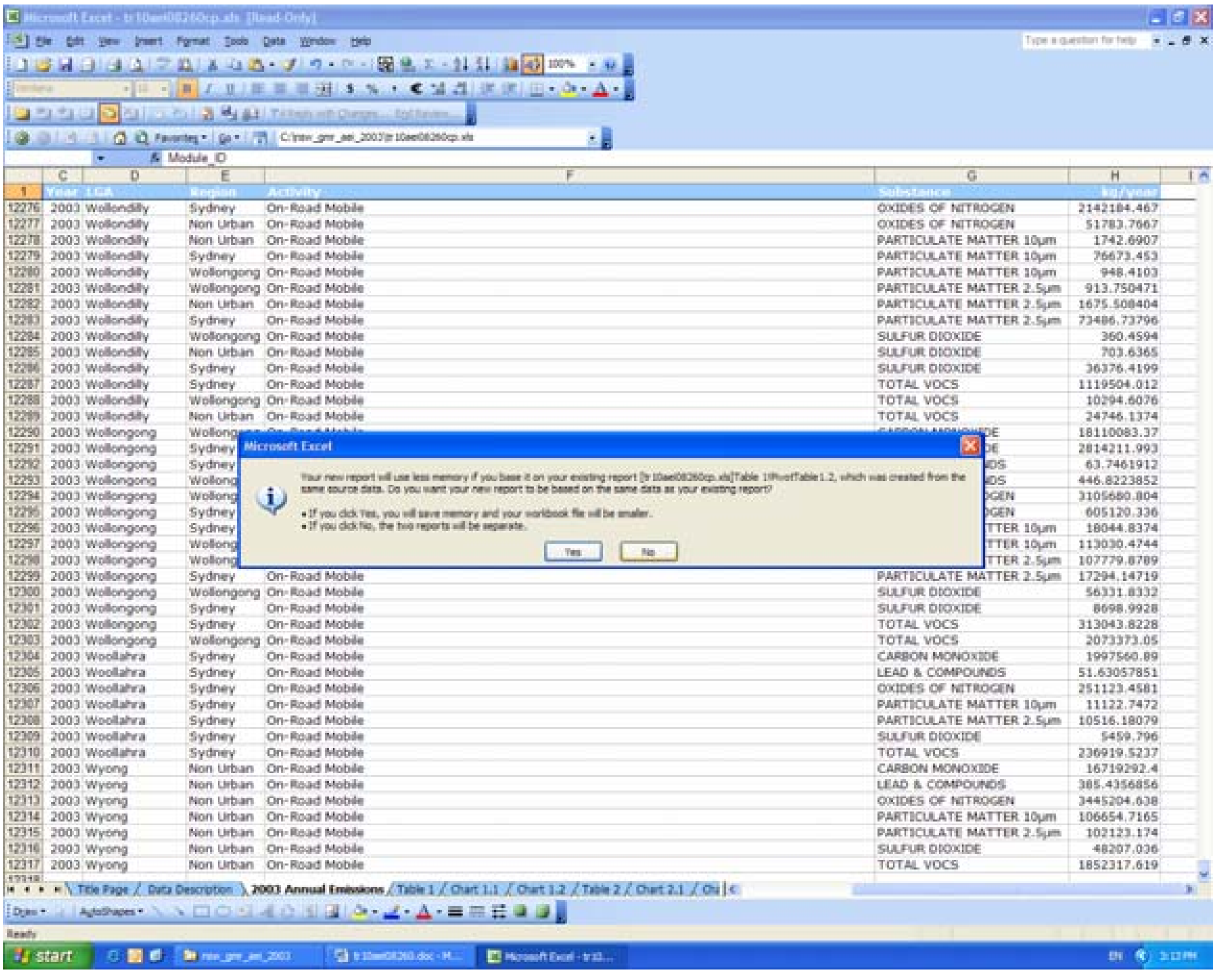


Figure 2.28 Example 3 – Select "No"

- **Step 6** – Select the pivot table report "Layout" button as shown in Figure 2.29

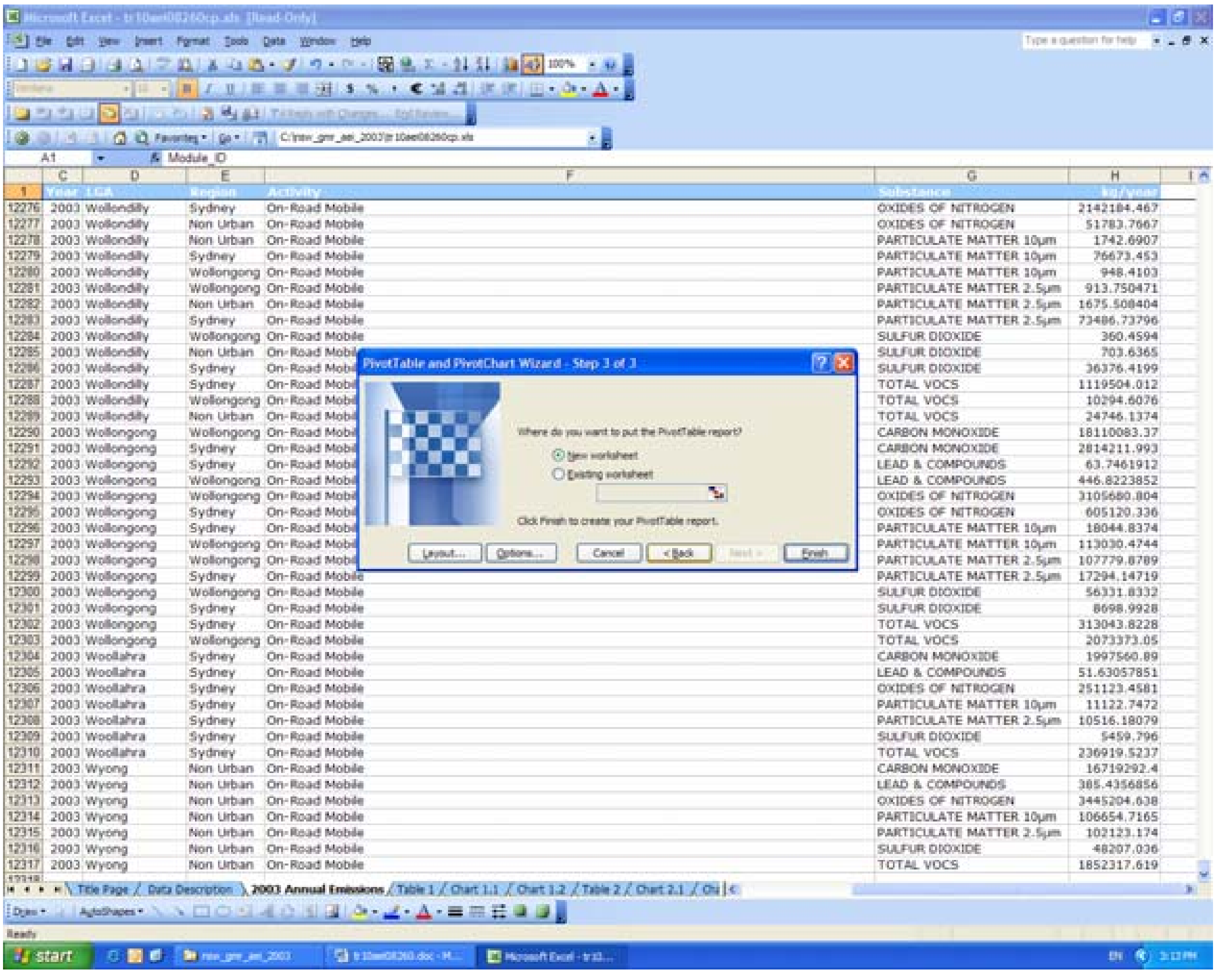


Figure 2.29 Example 3 – Select "Layout"

- **Step 7** – Construct the pivot table report by dragging the field button on the right to the diagram on the left as shown in Figure 2.30 and Figure 2.31

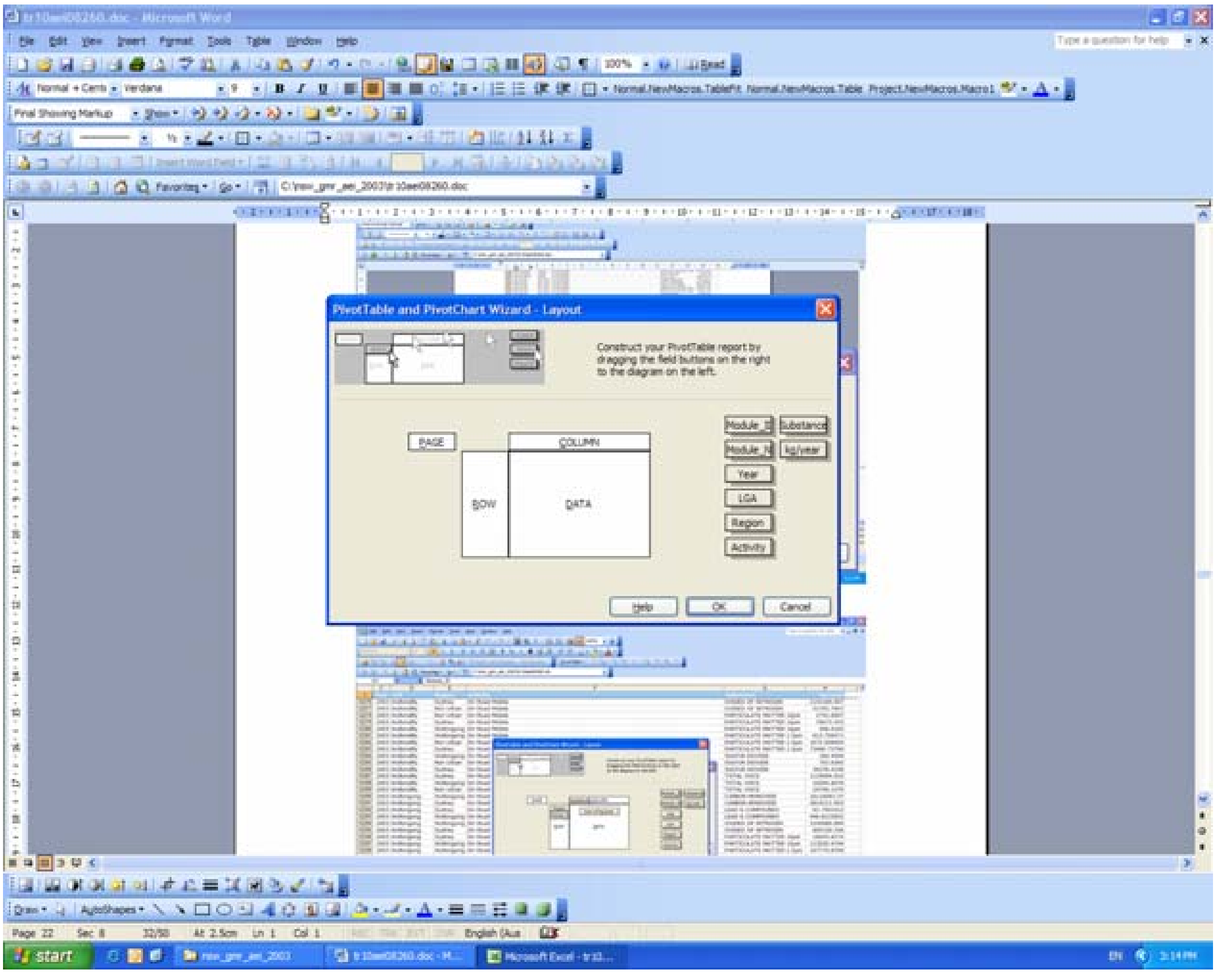


Figure 2.30 Example 3 – Pivot Table Layout Wizard

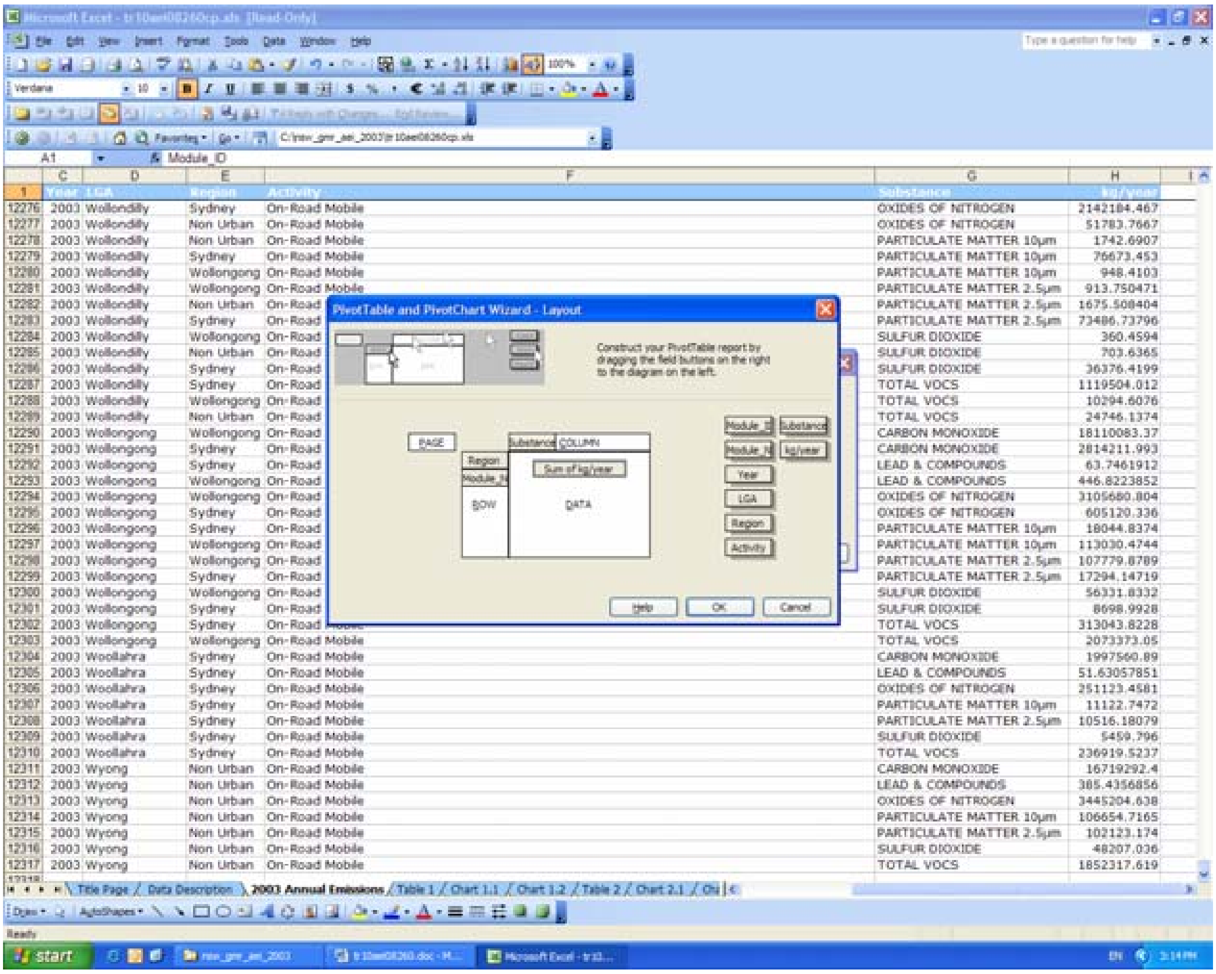


Figure 2.31 Example 3 – Drag "Field Button"

- **Step 8** – Double left mouse button click on the kg/year "Data" field button and then select the "Options" button. In the "Summarise by:" menu, select "Sum" and in the "Show data as:" menu, select "Normal", then select the "OK" button twice as shown in Figure 2.32

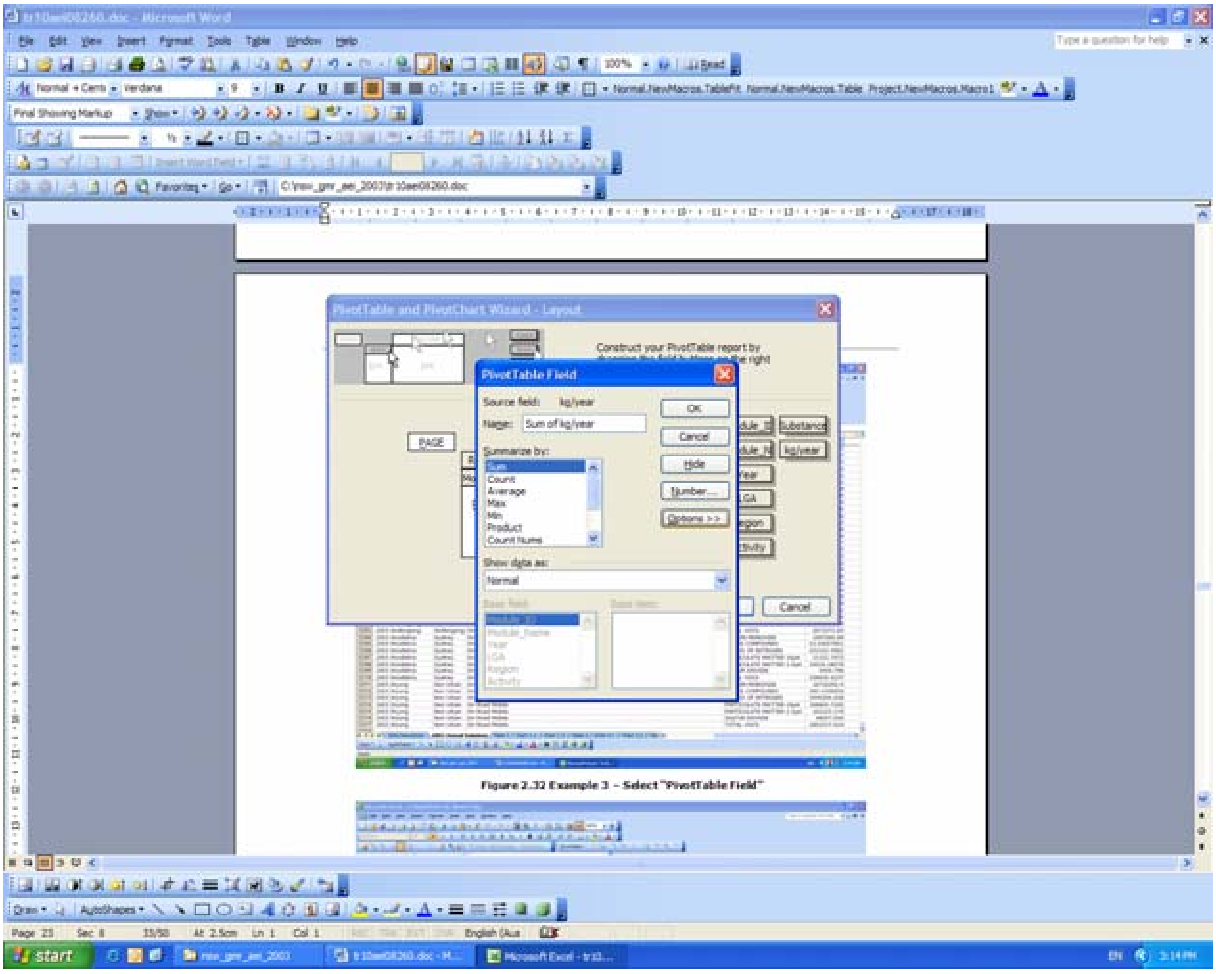


Figure 2.32 Example 3 – Select "PivotTable Field"

- **Step 9** - Select the pivot table report "Options" button as shown in Figure 2.33

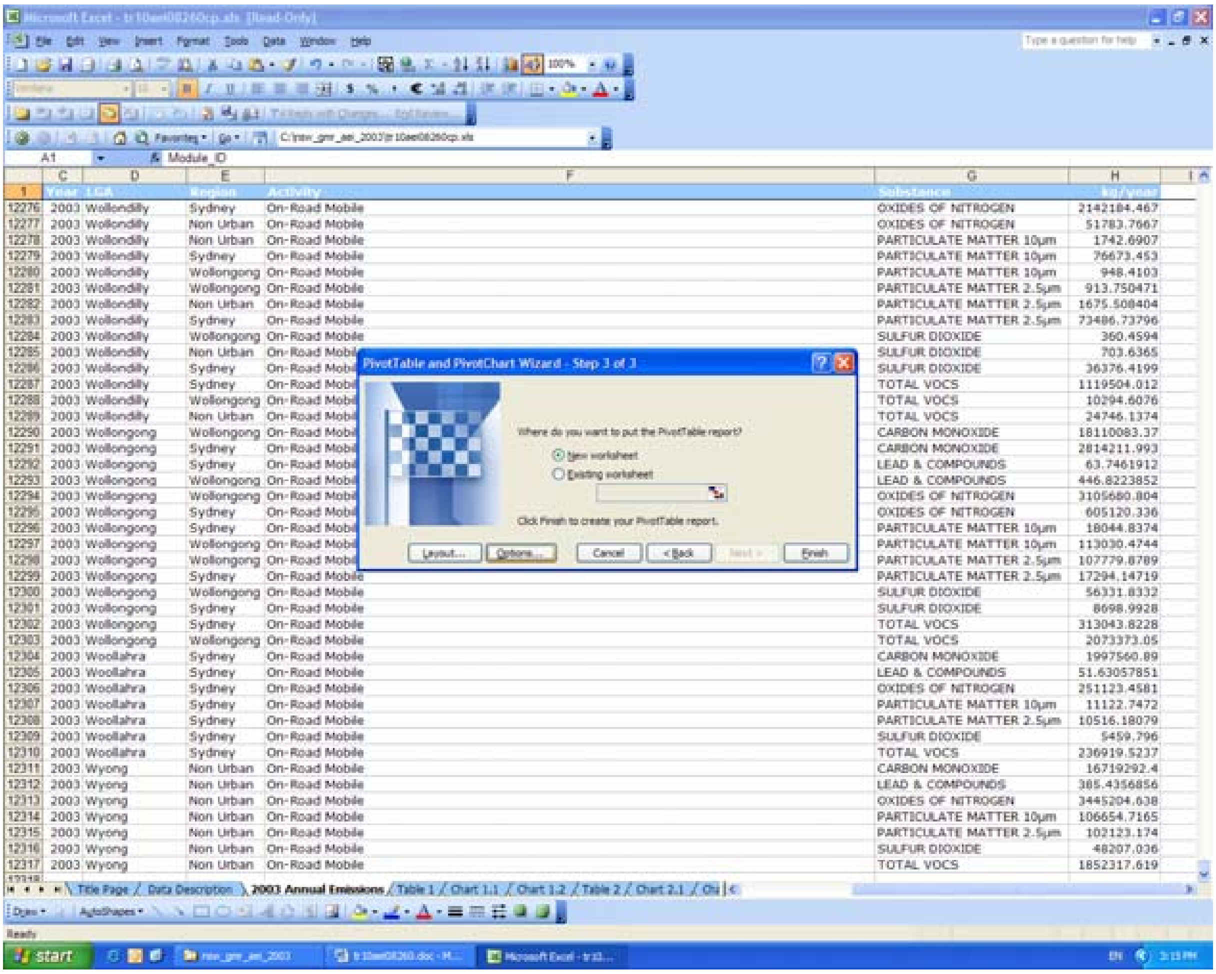


Figure 2.33 Example 3 - Select "Options"

- **Step 10** – Uncheck the "Grand total for columns", "Grand totals for rows" and Auto format table" boxes and select the "OK" button as shown in Figure 2.34

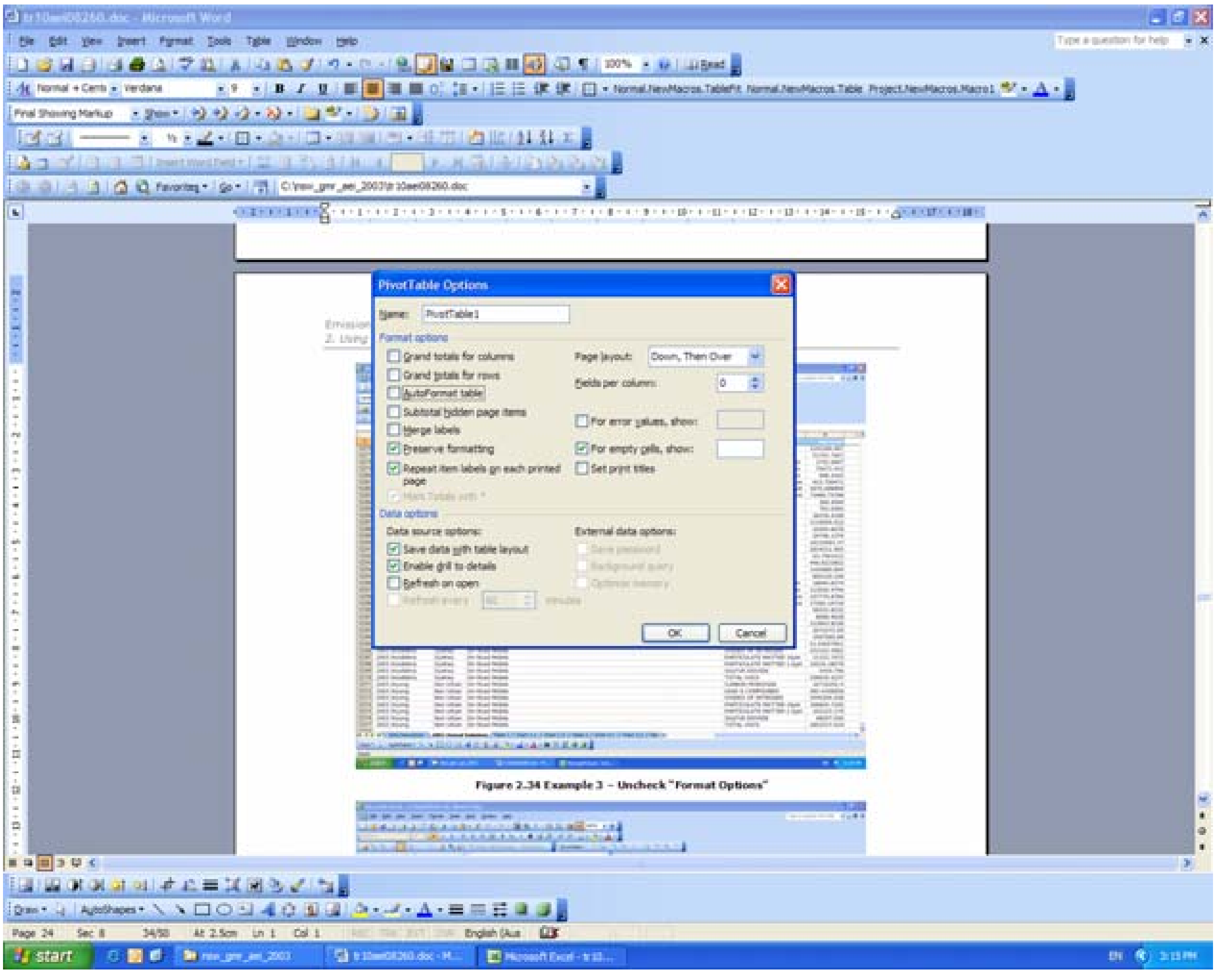


Figure 2.34 Example 3 – Uncheck "Format Options"

- **Step 11** – Select the “Finish” button as shown in Figure 2.35

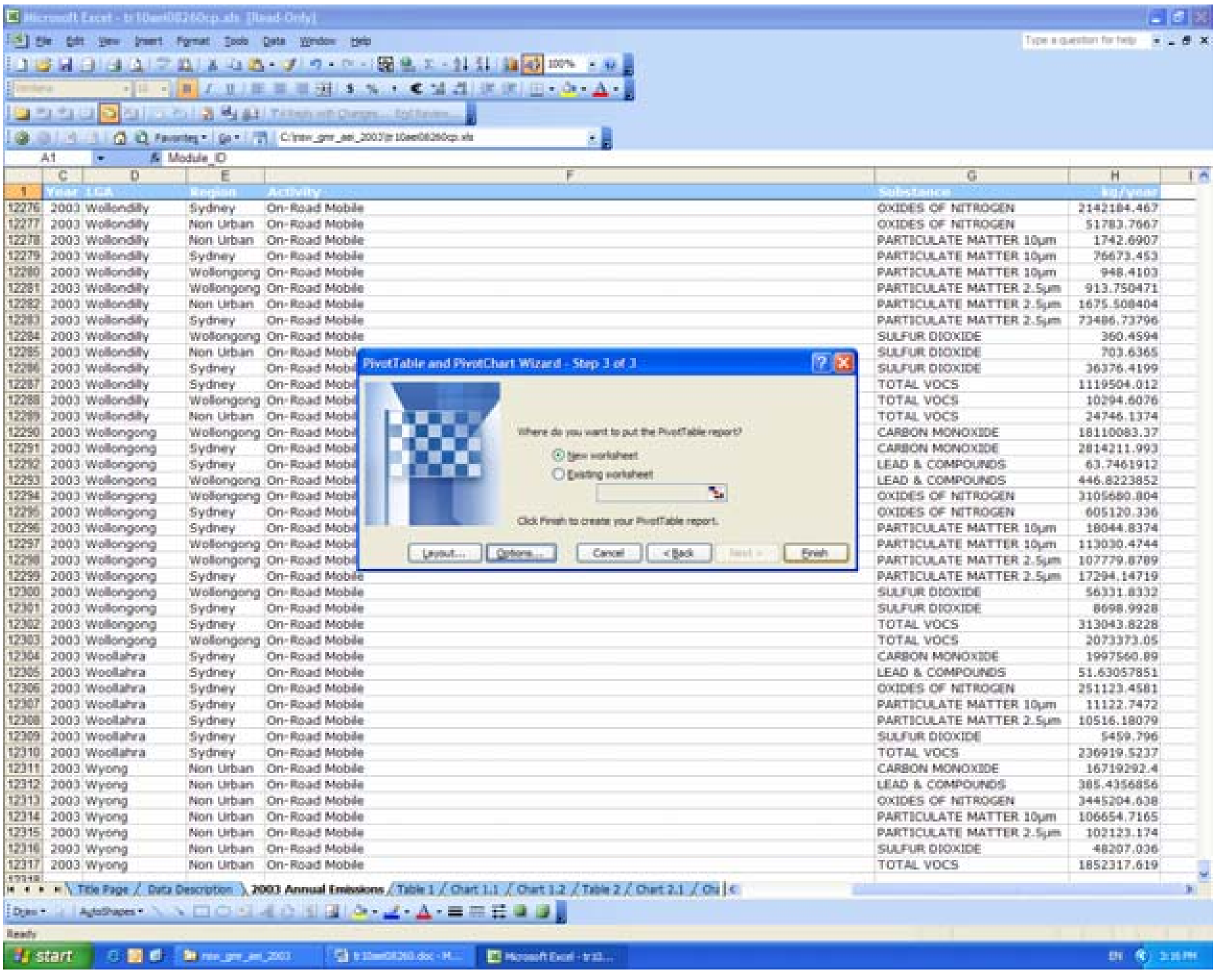
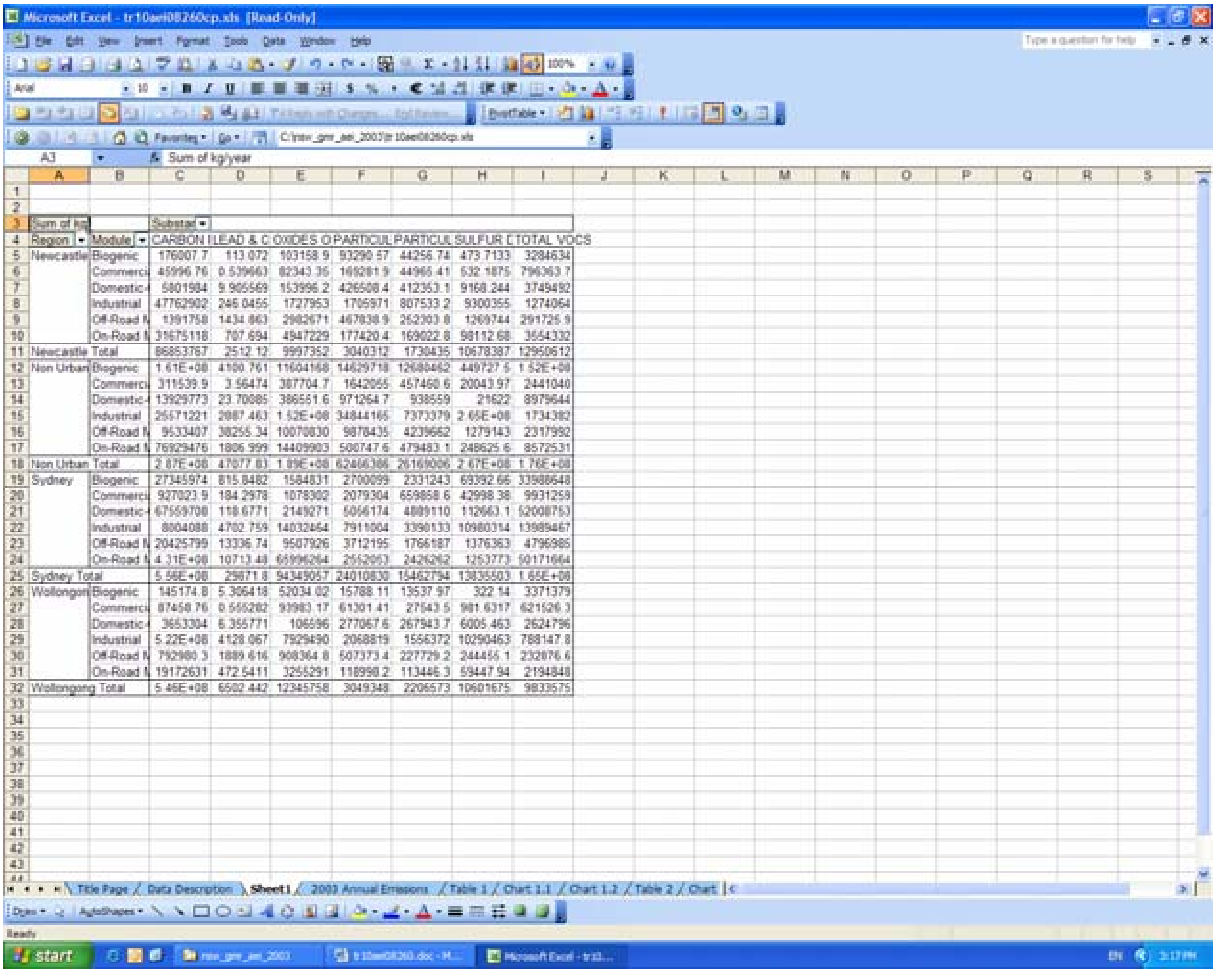


Figure 2.35 Example 3 – Select “Finish”

- **Step 12** - The completed pivot table report, which corresponds with Table 1.1 in the Excel™ workbook is shown in Figure 2.36



Sum of kg		Substan						
Region	Module	CARBON	LEAD & C	OXIDES O	PARTICUL	PARTICUL	SULFUR D	TOTAL VOCS
Newcastle	Biogenic	176007.7	113.072	103158.9	93290.57	44256.74	473.7133	3284634
	Commerci	45996.76	0.539663	82343.35	169281.9	44966.41	532.1875	796363.7
	Domestic-	5801984	9.905569	153996.2	426508.4	412353.1	9168.244	3749492
	Industrial	47762902	246.0456	1727953	1705971	807533.2	9300355	1274064
	Off-Road N	1391758	1434.863	2982671	467838.9	252303.8	1269744	291725.9
	On-Road N	31675118	707.694	4947229	177420.4	169022.8	98112.68	3554332
Newcastle Total		86853767	2512.12	9997352	3040312	1730435	10678387	12950612
Non Urban	Biogenic	1.61E+08	4100.761	11604168	14629718	12680462	449727.5	1.52E+08
	Commerci	311539.9	3.56474	387704.7	1642055	457460.6	20043.97	2441040
	Domestic-	13929773	23.70085	386551.6	971264.7	938559	21622	8979644
	Industrial	25571221	2887.463	1.52E+08	34844165	7373379	2.65E+08	1734382
	Off-Road N	9533407	38255.34	10070830	9878435	4239662	1279143	2317992
	On-Road N	76929476	1806.999	14409903	500747.6	479483.1	248625.6	8572531
Non Urban Total		2.87E+08	47077.83	1.89E+08	62466386	26169006	2.67E+08	1.76E+08
Sydney	Biogenic	27345974	815.8482	1584831	2700099	2331243	69392.66	33988648
	Commerci	927023.9	184.2978	1078302	2079304	659858.6	42998.38	9931259
	Domestic-	67559708	118.6771	2149271	5056174	4889110	112663.1	52008753
	Industrial	8004088	4702.759	14032464	7911004	3390133	10980314	13989467
	Off-Road N	20425799	13336.74	9507926	3712195	1766187	1376363	4796985
	On-Road N	4.31E+08	10713.48	65996264	2552063	2426262	1253773	50171664
Sydney Total		5.56E+08	29871.8	94349057	24010830	15462794	13835503	1.65E+08
Wollongon	Biogenic	145174.8	5.306418	52034.02	15788.11	13537.97	322.14	3371379
	Commerci	87458.76	0.555282	93983.17	61301.41	27543.5	981.6317	621526.3
	Domestic-	3653304	6.355771	106596	277067.6	267943.7	6005.463	2624796
	Industrial	5.22E+08	4128.067	7929490	2068819	1556372	10290463	788147.8
	Off-Road N	792980.3	1889.616	908364.8	507373.4	227729.2	244455.1	232876.6
	On-Road N	19172631	472.5411	3255291	118998.2	113446.3	59447.94	2194848
Wollongong Total		5.46E+08	6502.442	12345758	3049348	2206573	10601675	9833575

Figure 2.36 Example 3 – Unformatted Pivot Table Report

- **Step 13** – Change the order of the regions with Sydney, Newcastle, Wollongong and Non Urban from first to last. Move to the cell containing "Sydney" and right mouse button click. Select "Order" and "Move to Beginning" from the drop-down menus. Select the order for all other regions using the same method as shown in Figure 2.37

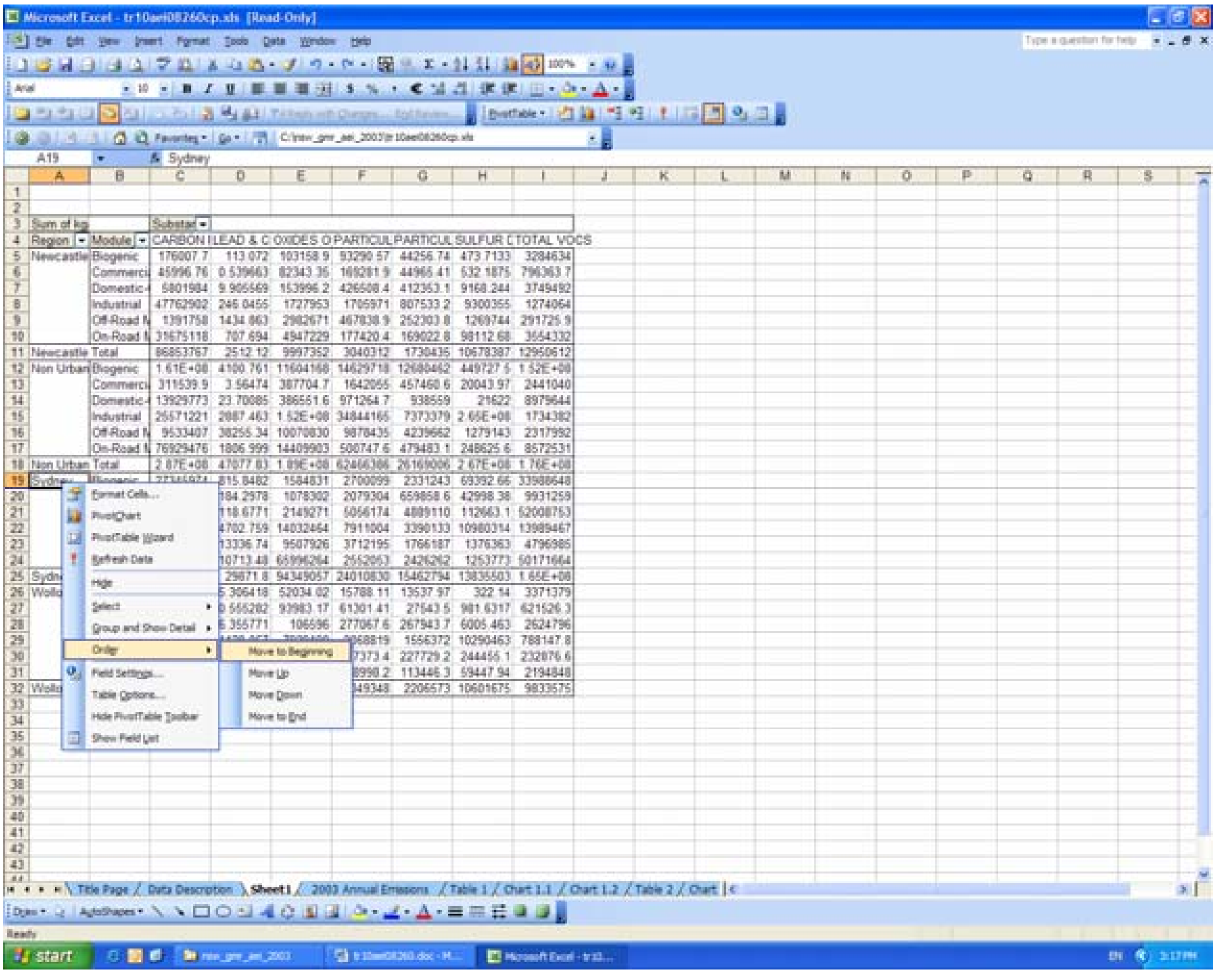


Figure 2.37 Example 3 – Select "Order"

- **Step 14** – Select the entire pivot table report and then select the custom number format created for the Excel™ workbook. To do this, select “F<u>o</u>rmat” and “C<u>e</u>lls” from the command menu as shown in Figure 2.38

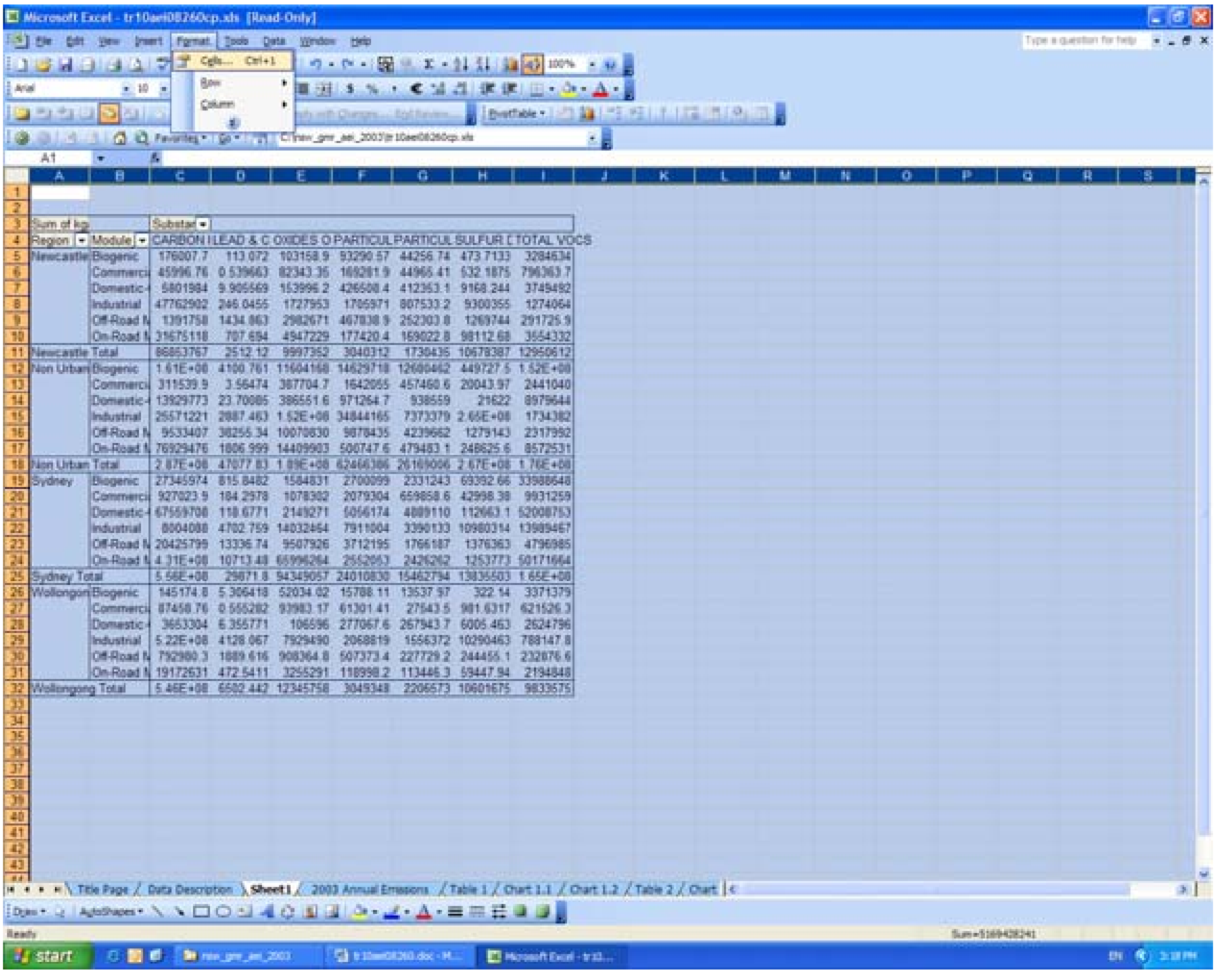


Figure 2.38 Example 3 - Select “F<u>o</u>rmat” and “C<u>e</u>lls”

- **Step 15** – Select the "Number" tab and the "Category:" "Custom" from the list. Scroll down to the end of the "Type:" list and select the format "[>100]#,##0;[<0.01]#.#0E-#0;0.00" for emissions in kg/year or the format "[>0.01]0.00%;[<0.00001]0.000000%;0.0000%" for proportion of emissions in % as shown in Figure 2.39. You may create other custom number formats. Please refer to "Help" in the command menu for further assistance

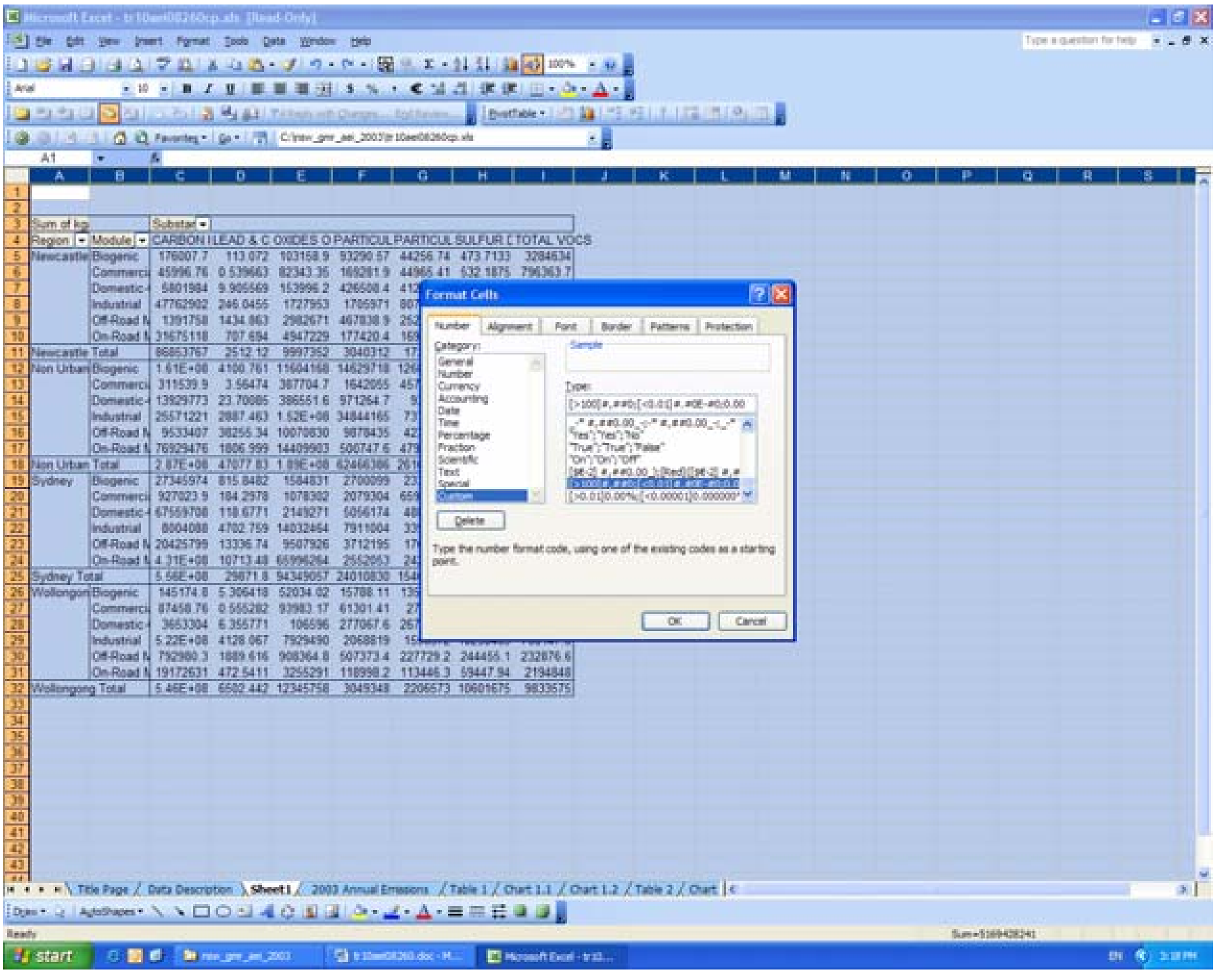


Figure 2.39 Example 3 – Select "Type"

- **Step 16** – Select the desired cell "Alignment", "Font", "Borders" and "Patterns" according to Step 14. The final pivot table report will look like that shown in Figure 2.40. Please refer to "Help" in the command menu for further assistance

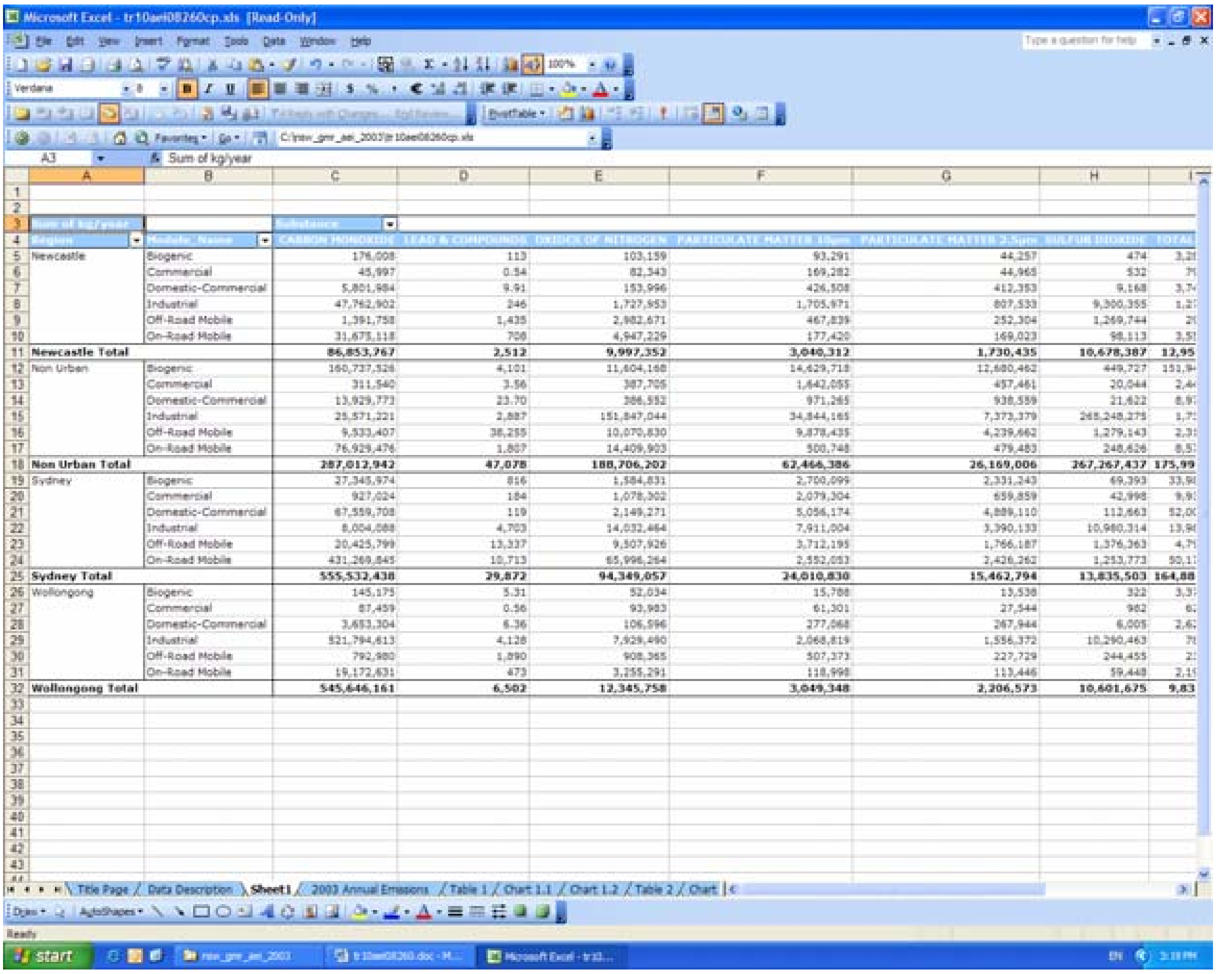


Figure 2.40 Example 3 – Formatted Pivot Table Report

- **Step 17** – Make the desired selections from the "Region" (e.g. Sydney), "Module_Name" (e.g. (Show All)) and "Substance" (e.g. TOTAL VOCS) drop-down menus as described in Example 1 (Section 2.4.1)

- **Step 18** – Copy the table from the Excel™ workbook, past into a Word™ document if required and format as shown in Table 2.1

Table 2.1 Example 3 – Formatted Word™ Table

Emissions (kg/year)		Substance
Region	Module_Name	TOTAL VOCS
Sydney	Biogenic	33,988,648
	Commercial	9,931,259
	Domestic-Commercial	52,008,753
	Industrial	13,989,467
	Off-Road Mobile	4,796,985
	On-Road Mobile	50,171,664
Sydney Total		**164,886,777**

2.6 Using and Interpreting Existing Pivot Chart Reports

2.6.1 Example 4 – Using Pivot Chart Reports

Example 4 investigates the use of Chart 7.1 in the Excel™ workbook. Chart 7.1 contains an annual emissions pivot chart report by LGA, module and activity during 2003 in kg/year. Start by navigating to the "Chart 7.1" worksheet using any of the methods described previously as shown in Figure 2.41.

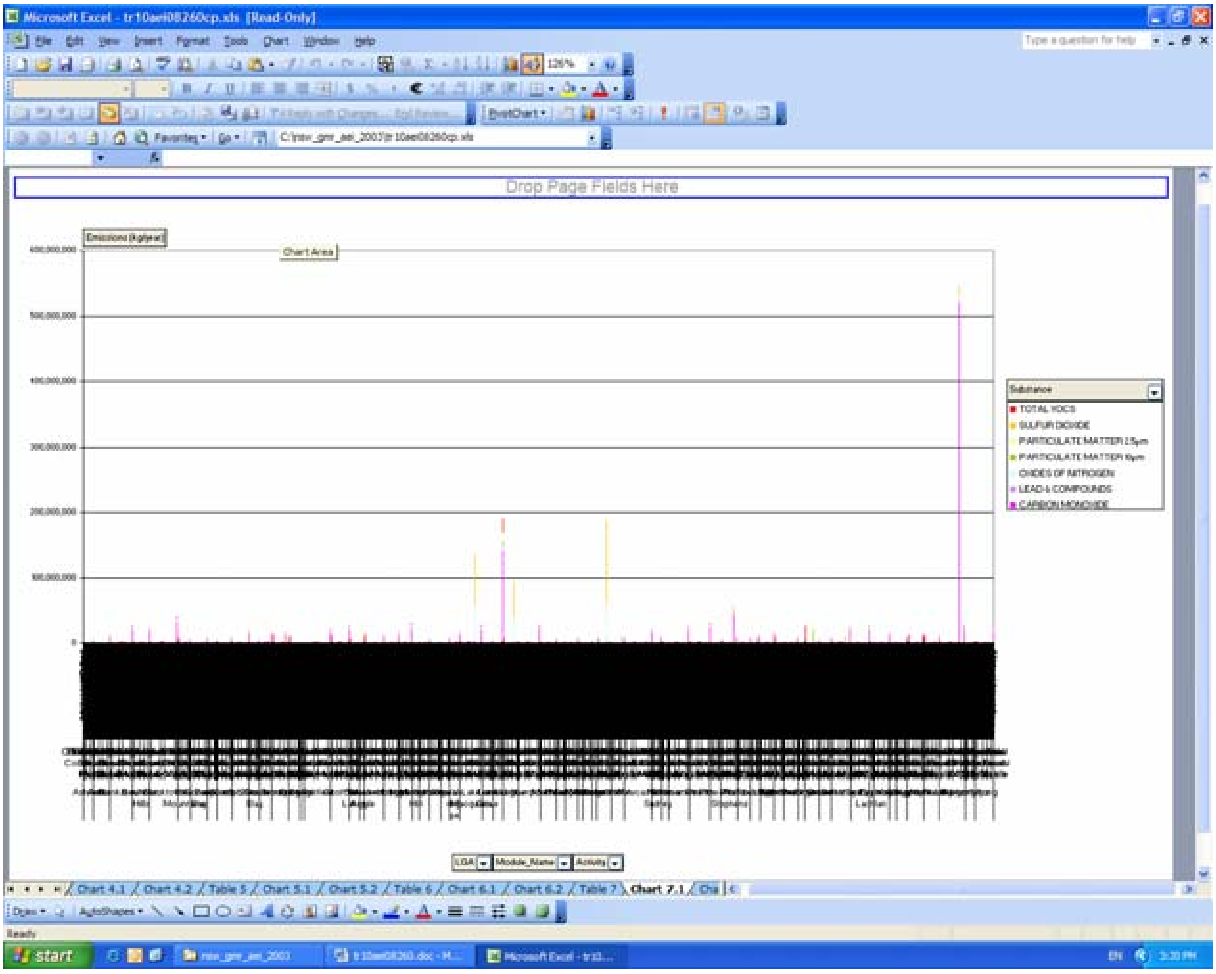


Figure 2.41 Example 4 - Navigate to "Chart 7.1" Worksheet

The pivot chart contains drop-down menus that allow you to make the following selections:

- Local Government Area (LGA) (e.g. Ashfield)
- Module_Name (i.e. Biogenic, Commercial, Domestic-Commercial, Industrial, Off-Road Mobile and On-Road Mobile)
- Activity (e.g. Automotive Fuel Retailing)
- Substance (e.g. CARBON MONOXIDE)

In Example 4, the following selections have been made using the drop-down menus:

- LGA - Ashfield
- Module_Name - All
- Activity - All
- Substance – TOTAL VOCS

The steps required to do this are described below:

- **Step 1** – Select the “LGA” drop-down menu, uncheck the “(Show All)” box and check the “Ashfield” box as shown in Figure 2.42

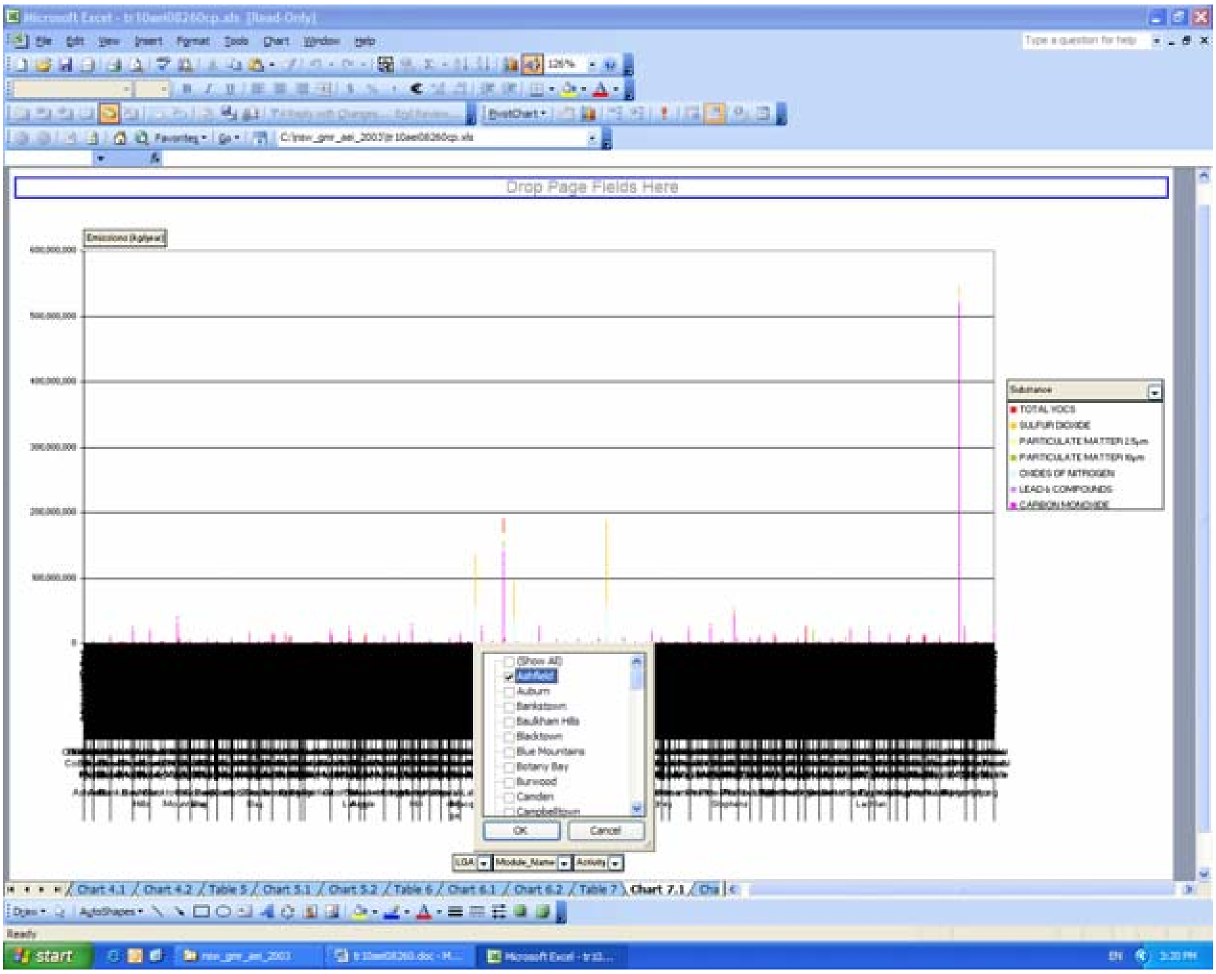


Figure 2.42 Example 4 - Select “LGA”

- **Step 2** – Select the “Module_Name” drop-down menu – No selections are required because all are checked by default
- **Step 3** – Select the “Activity” drop-down menu - No selections are required because all are checked by default

- **Step 4** - Select the "Substance" drop-down menu, uncheck the "(Show All)" box and check the "TOTAL VOCS" box as shown in Figure 2.43

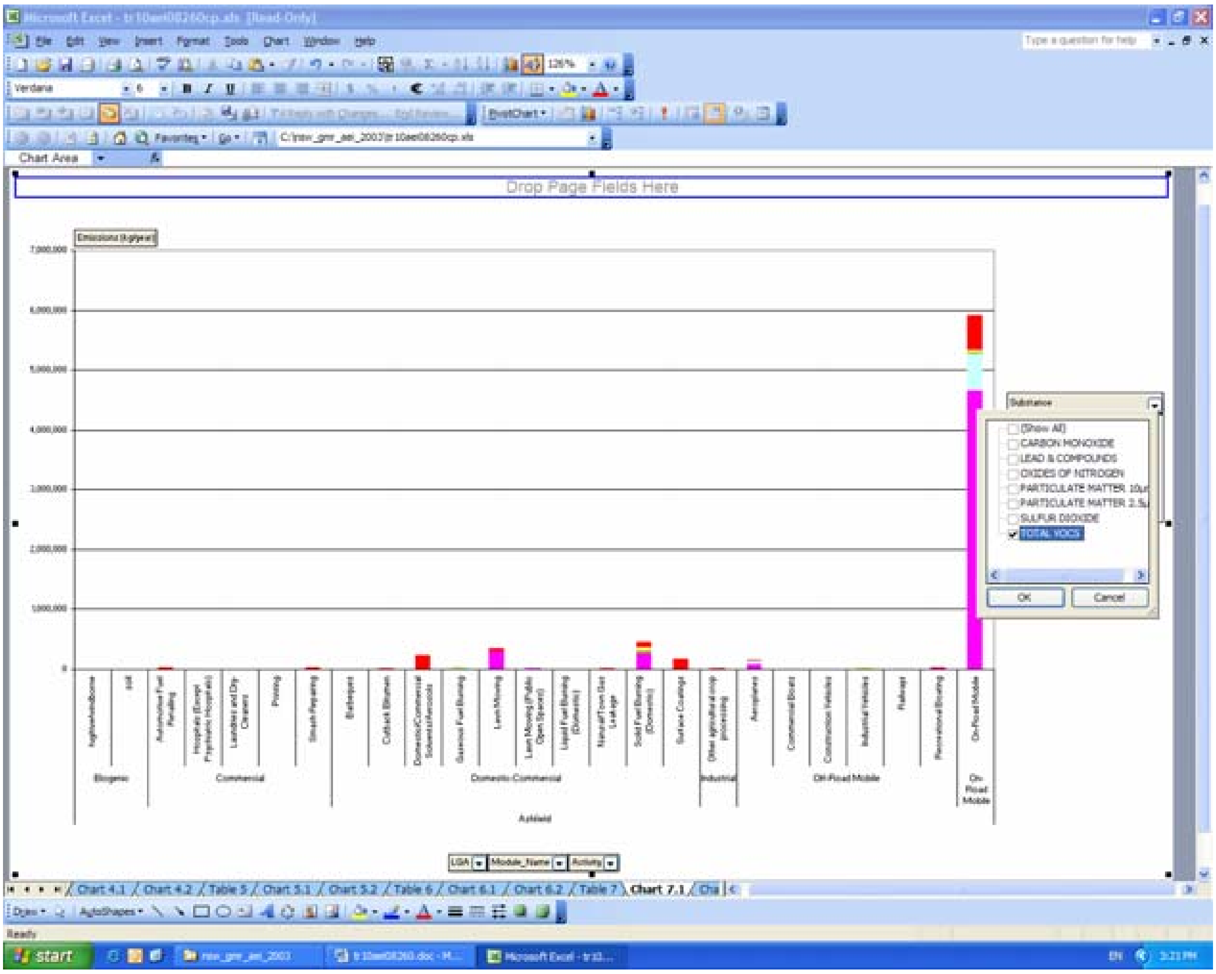


Figure 2.43 Example 4 - Select "Substance"

After making these selections, the Example 4 pivot chart report will look like that shown in Figure 2.44.

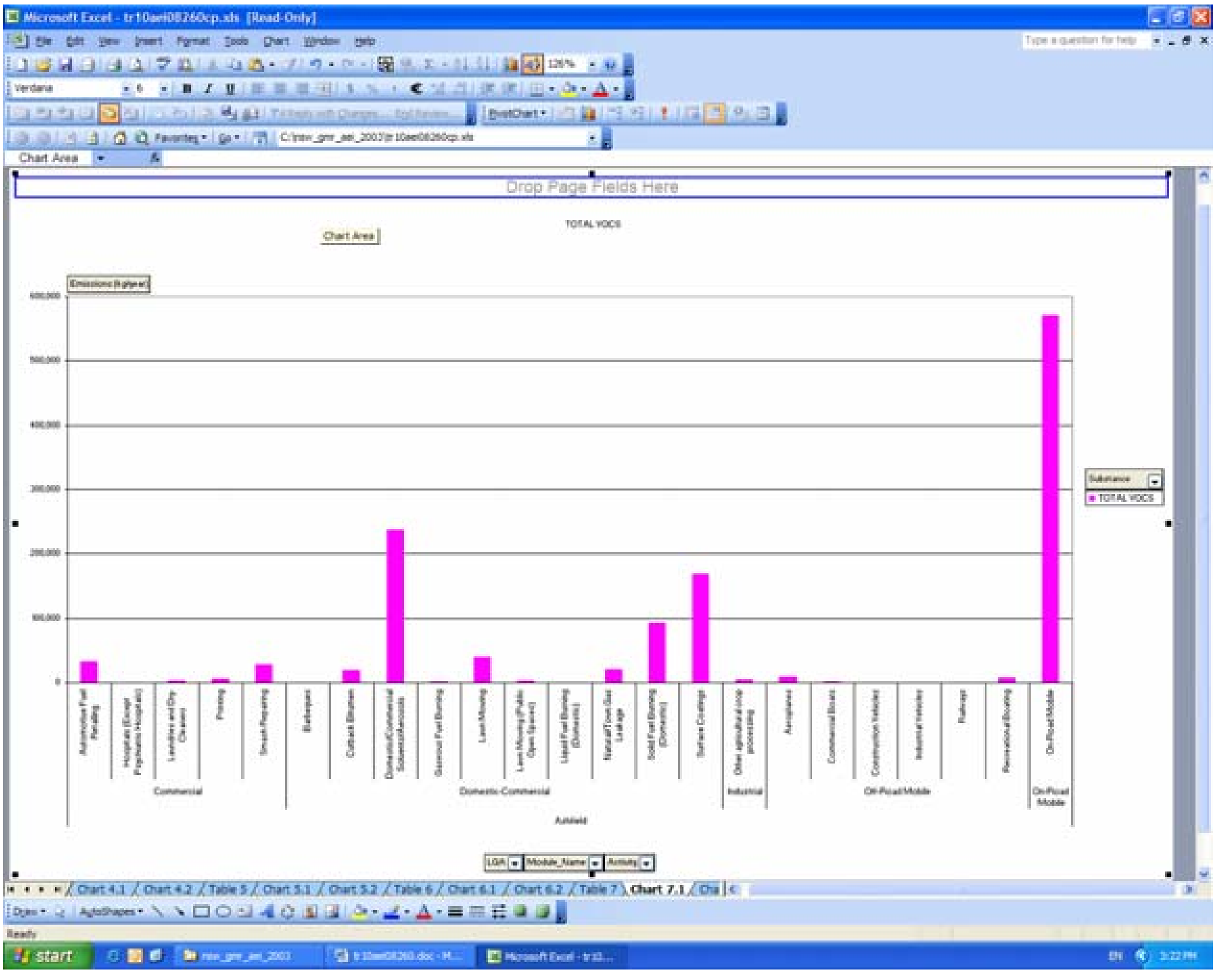


Figure 2.44 Example 4 - Pivot Chart Report

You should note that Chart 7.1 is based on Table 7.1, so the information presented in the table will also be modified according to these selections. Refer to Example 1 (Section 2.4.1), which shows the accompanying changes to the table.

2.6.2 Example 5 – Interpreting Pivot Chart Reports

Extra care should be exercised when interpreting the results of the pivot chart reports that present emissions as a proportion of the total.

Example 5 investigates the use of Chart 7.2 in the Excel™ workbook. Chart 7.2 contains the proportion of annual emissions pivot chart report by LGA, module and activity during 2003 in %. Start by navigating to the “Chart 7.2” worksheet using any of the methods described previously and make the selections from the drop-down menus like Example 4 as shown in Figure 2.45.

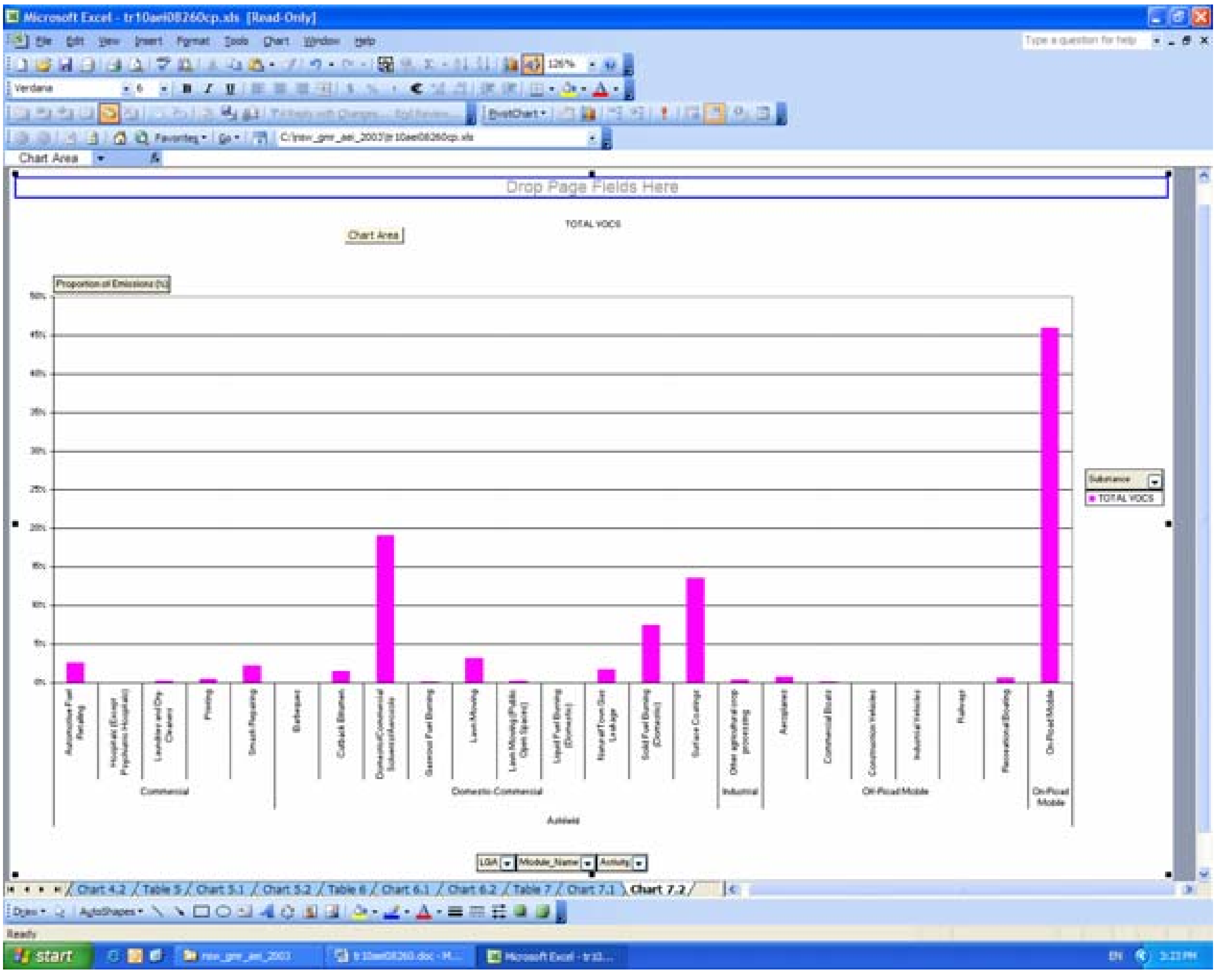


Figure 2.45 Example 5 - Navigate to “Chart 7.2” Worksheet

You will notice the Ashfield Total is 100%, since only the Ashfield LGA has been selected as shown in Figure 2.45. All other proportions shown in the pivot chart report are proportions of annual emissions in Ashfield LGA only. However, if all LGAs are selected, you will notice the Ashfield Total is 0.34 % as shown in Figure 2.46. All other proportions shown in the pivot chart report are proportions of annual emissions in all LGAs (i.e. GMR).

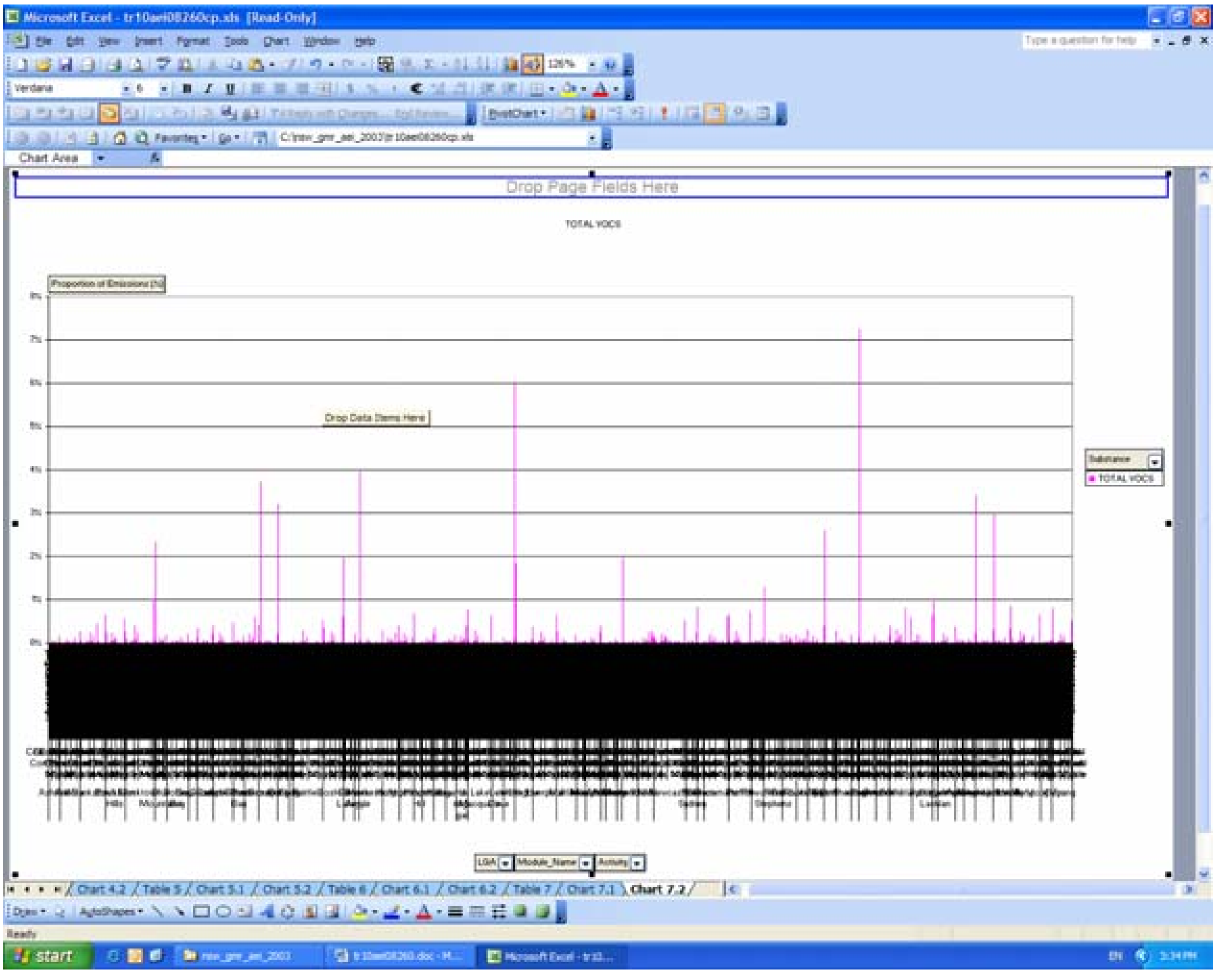


Figure 2.46 Example 5 - Pivot Chart Report with all LGAs Selected

2.7 Creating New Pivot Chart Reports

2.7.1 Example 6 – Creating Pivot Chart Reports

Example 6 describes the steps required to create a pivot chart report. Specifically, Chart 1.1 in the Excel™ workbook will be created from first principals. Chart 1.1 contains the annual emissions pivot chart report by region and module during 2003 in kg/year.

The steps required to do this are described below:

- **Step 1** – Navigate to the “Table 1.1” worksheet and select any cell within the pivot table report as shown in Figure 2.47

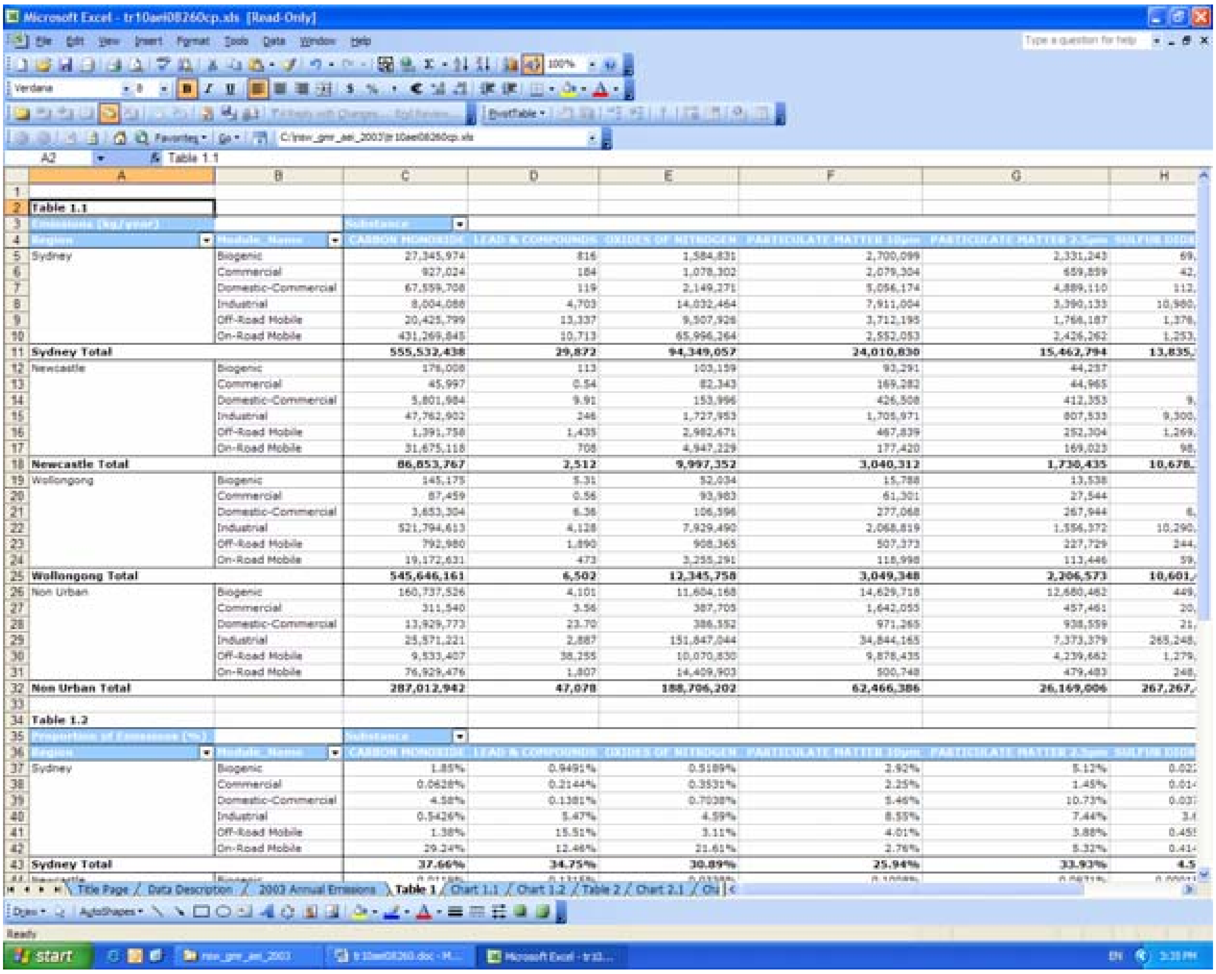


Figure 2.47 Example 6 - Navigate to “Table 1.1” Worksheet

- **Step 2** - Select "View", "Toolbars" and "PivotTable" from the command menu as shown in Figure 2.48. The "PivotTable" toolbar will now appear

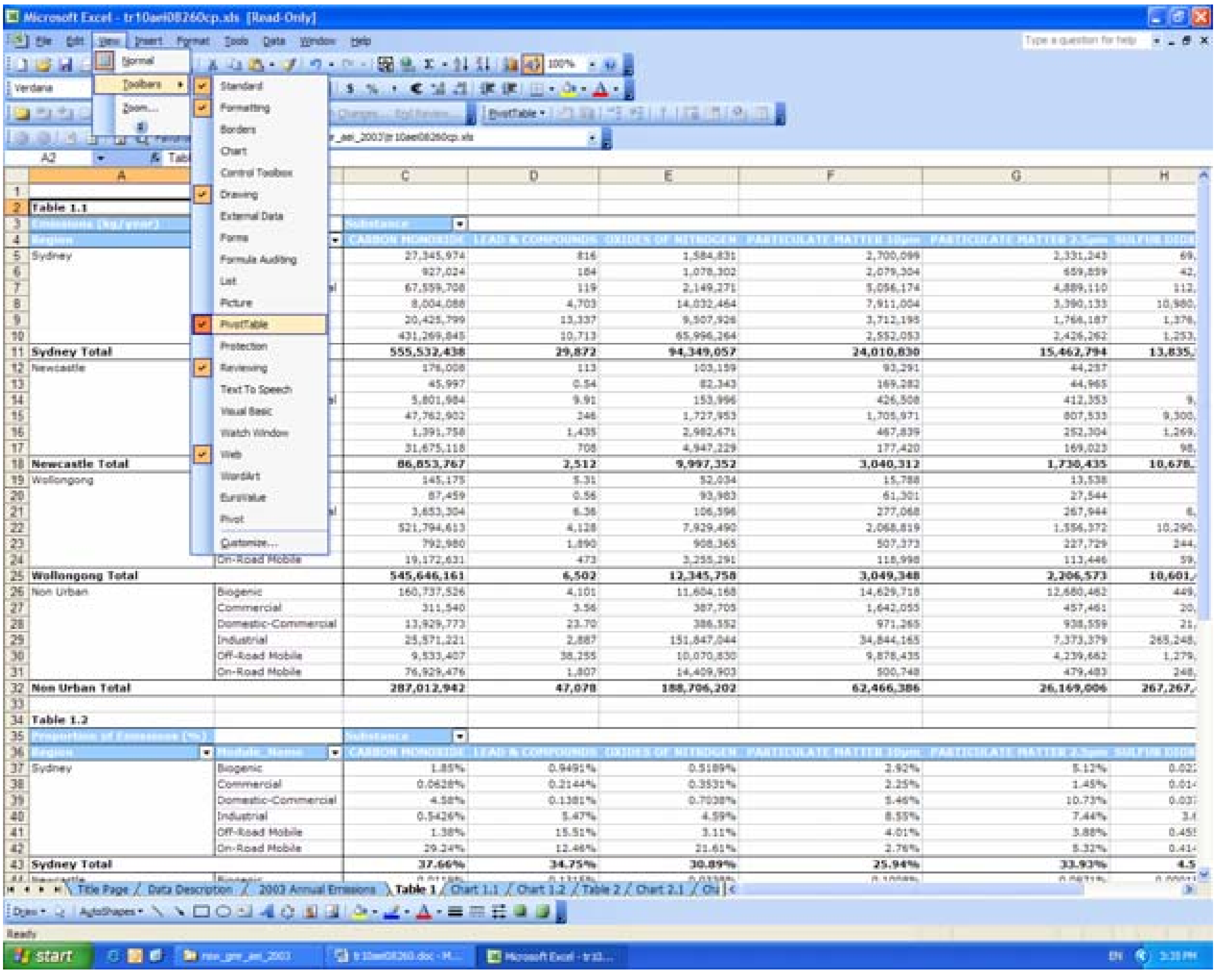


Figure 2.48 Example 6 – Select "View", "Toolbars" and "PivotTable"

- **Step 3** – Select the “Chart Wizard” from the “PivotTable” toolbar as shown in Figure 2.49

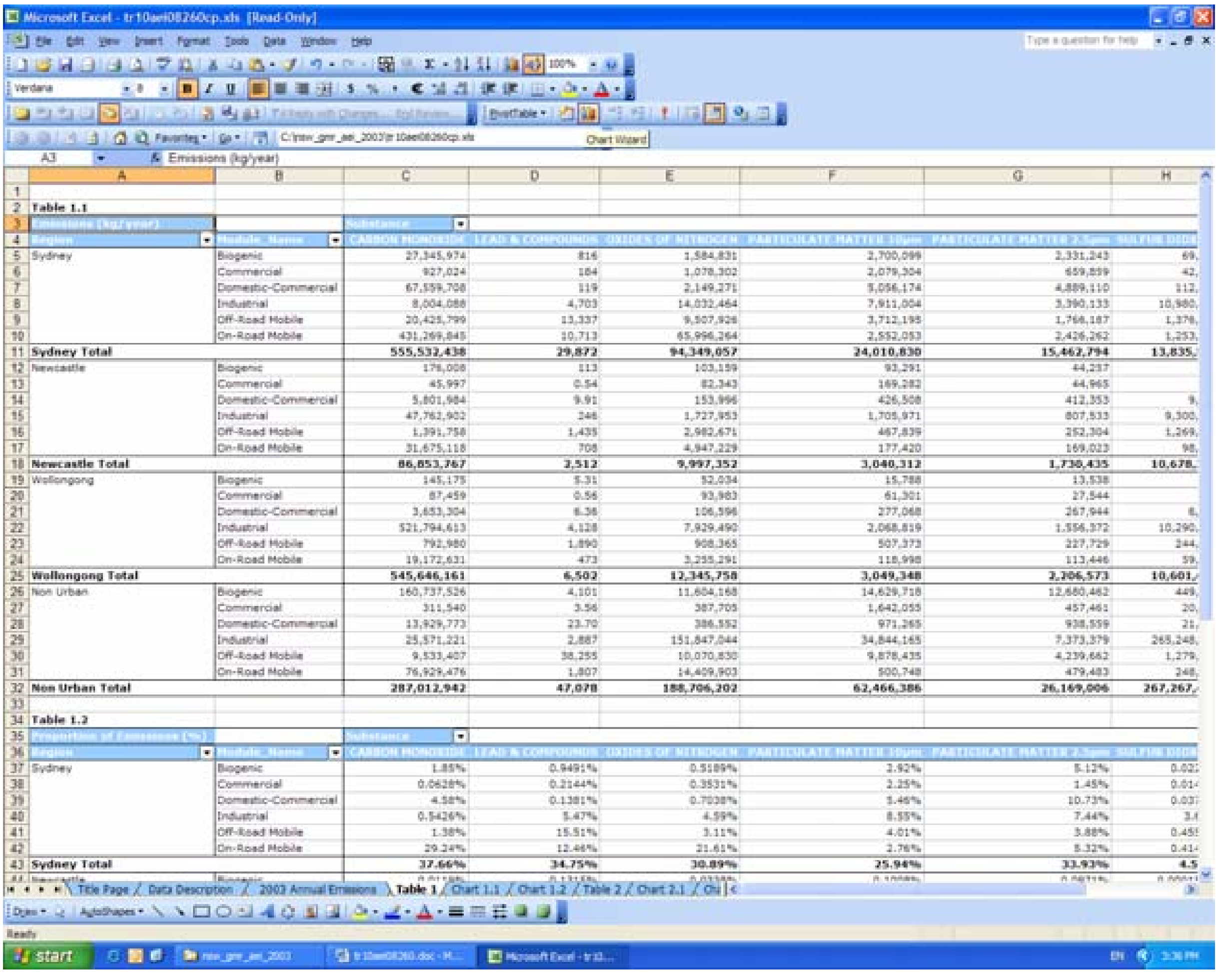


Figure 2.49 Example 6 – Select “Chart Wizard”

- **Step 4** - The completed pivot chart report, which corresponds with Chart 1.1 in the Excel™ workbook is shown in Figure 2.50

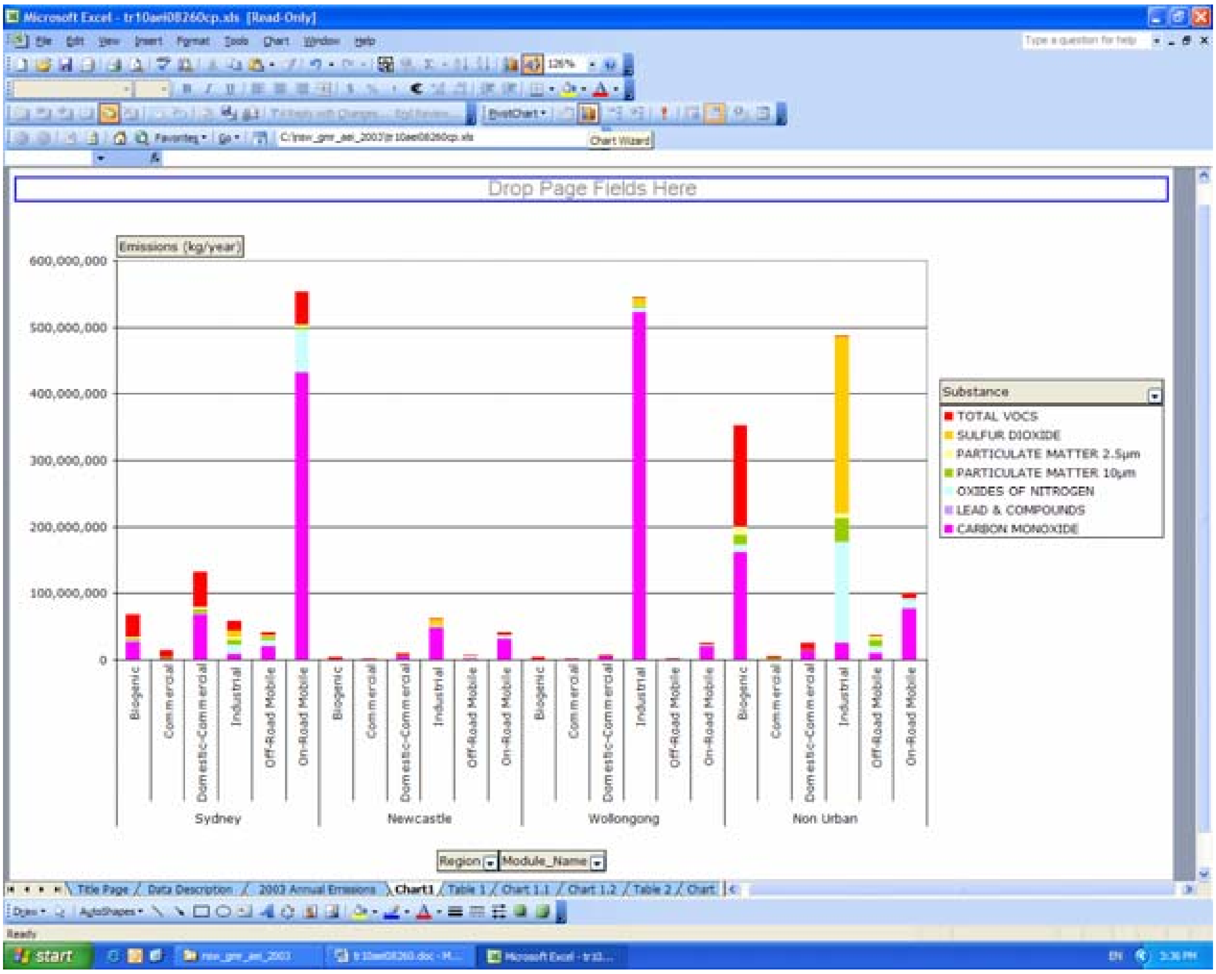


Figure 2.50 Example 6 – Pivot Chart Report with no Selections

- **Step 5** – From the drop-down menus in the pivot chart report, make the following selections:
    - o “Substance” – “TOTAL VOCS”
    - o “Region” – “Sydney”
    - o “Module_Name” – “(Show All)”

You will now notice all the original formatting has been lost as shown in Figure 2.51. The loss of pivot chart report formatting will occur every time a new series of selections is made from the drop-down menu in a pivot table or pivot chart and is a well-known Excel™ shortcoming. One of the easiest ways to easily reapply the desired chart format is to develop a “User-defined” “Custom Type” and save it. This format can then be reapplied time after time quite easily

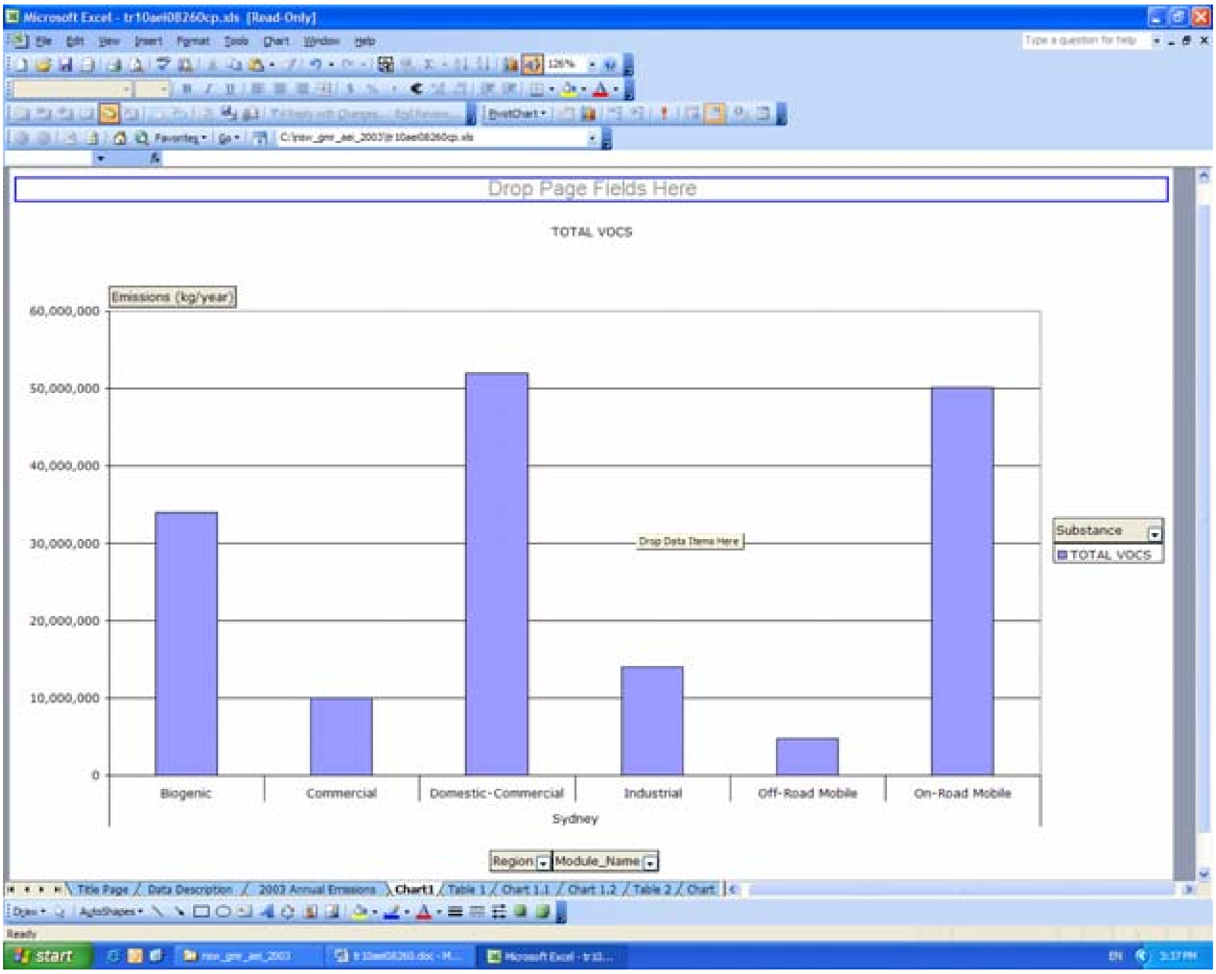


Figure 2.51 Example 6 – Pivot Chart Report with Selections

- **Step 6** – Select the pivot chart report, right mouse button click and then select "Chart Type" as shown in Figure 2.52

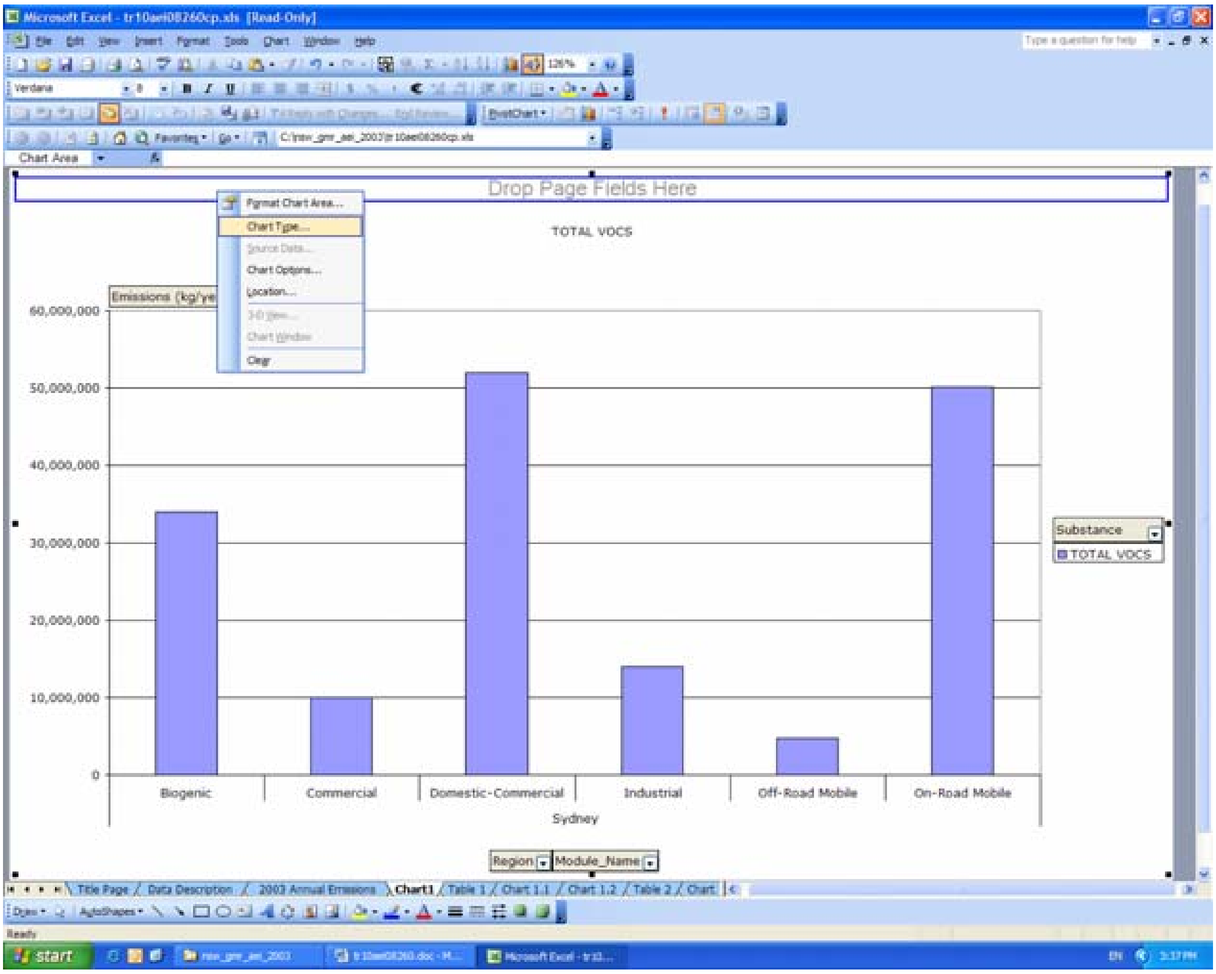


Figure 2.52 Example 6 - Select "Chart Type"

- **Step 7** – At Chart 1.1, select the "Custom Types" tab and the "User-defined" radio button and press the "Add" button as shown in Figure 2.53. Enter the "Name" as "Pivot Chart v1" and "Description" as "Apply to: Charts 1.1 & 2.1" and press the "OK" button twice as shown in Figure 2.54. At Charts 1.2, 3.1 and 3.2, follow the same procedure and create "Pivot Chart v2" and "Apply to: Charts 1.2 and 2.2", "Pivot Chart v3" and "Apply to: Charts 3.1, 4.1, 5.1, 6.1 and 7.1" and "Pivot Chart v4" and "Apply to: Charts 3.2, 4.2, 5.2, 6.2 and 7.2". Pivot Chart v1 to Pivot Chart v4 will now be available for you to apply time after time. You may create other custom chart formats. Please refer to "Help" in the command menu for further assistance

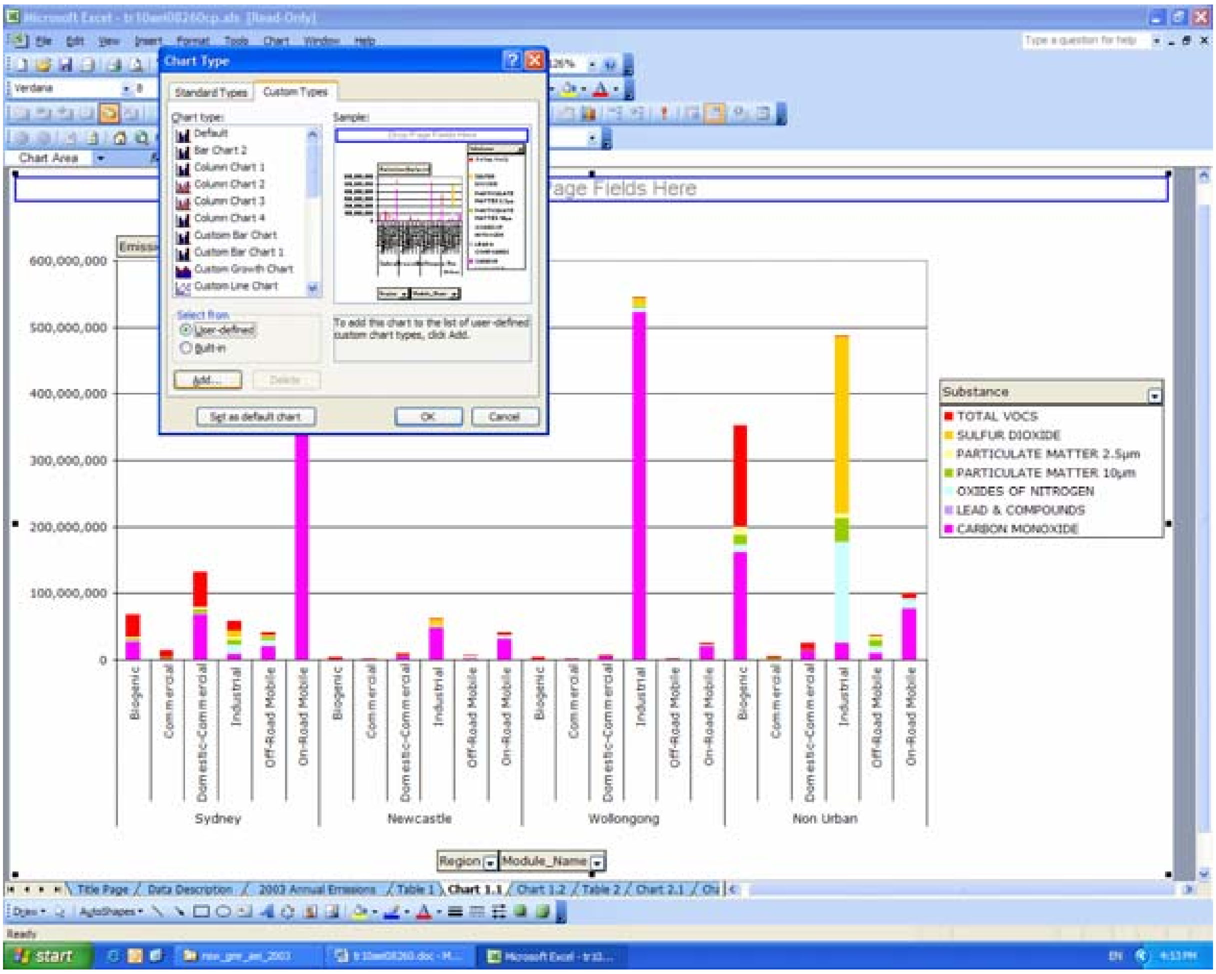


Figure 2.53 Example 6 – Select "Add"

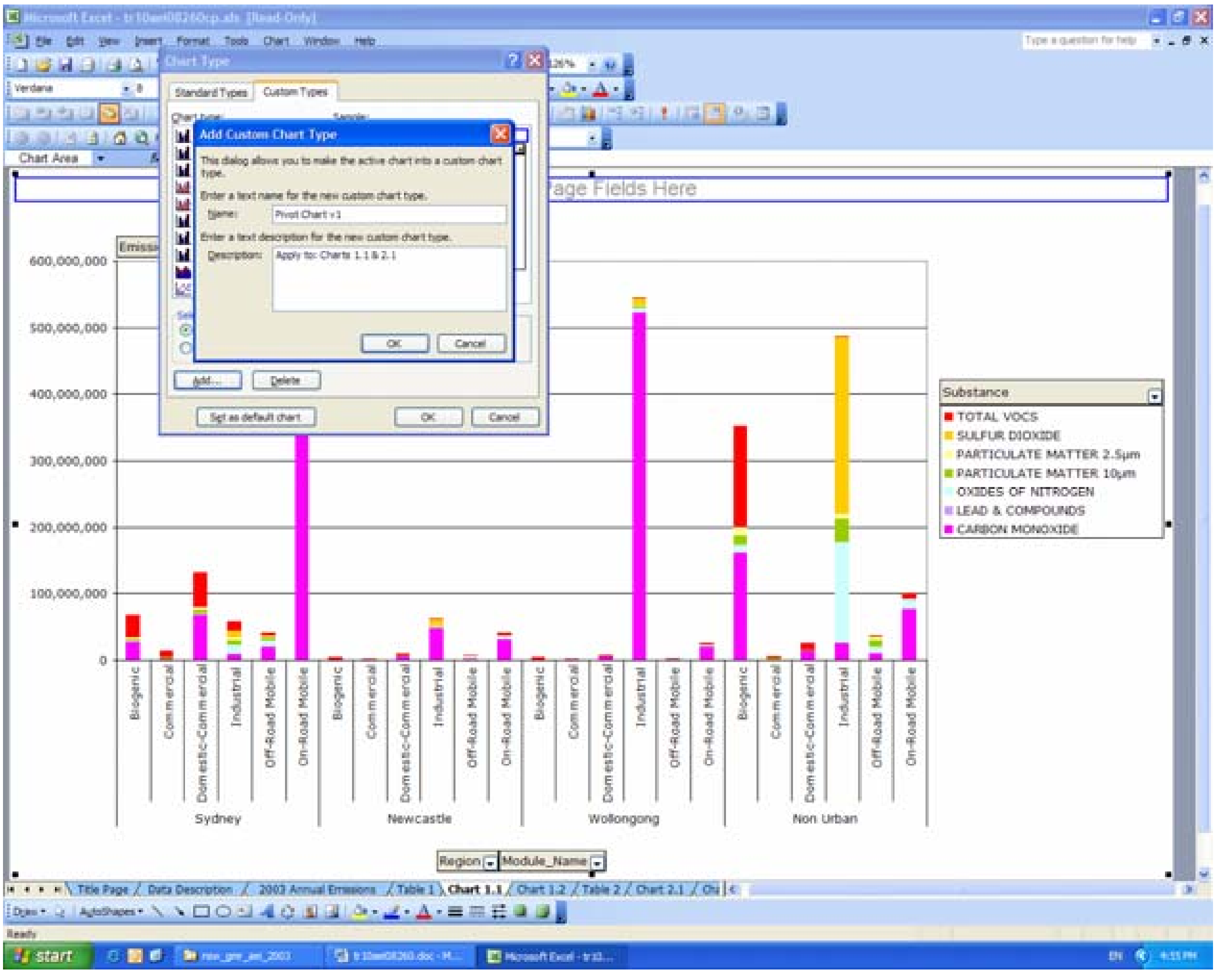


Figure 2.54 Example 6 – Enter "Name" and "Description"

- **Step 8** – Select the "Custom Types" tab and the "User-defined" radio button as shown in Figure 2.55. Scroll down to the end of the "Chart type" list and select "Pivot Chart v1" for Charts 1.1 and 2.1, "Pivot Chart v2" for Charts 1.2 and 2.2, "Pivot Chart v3" for Charts 3.1, 4.1, 5.1, 6.1 and 7.1 and "Pivot Chart v4" for Charts 3.2, 4.2, 5.2, 6.2 and 7.2 and then select the OK button as shown in Figure 2.56

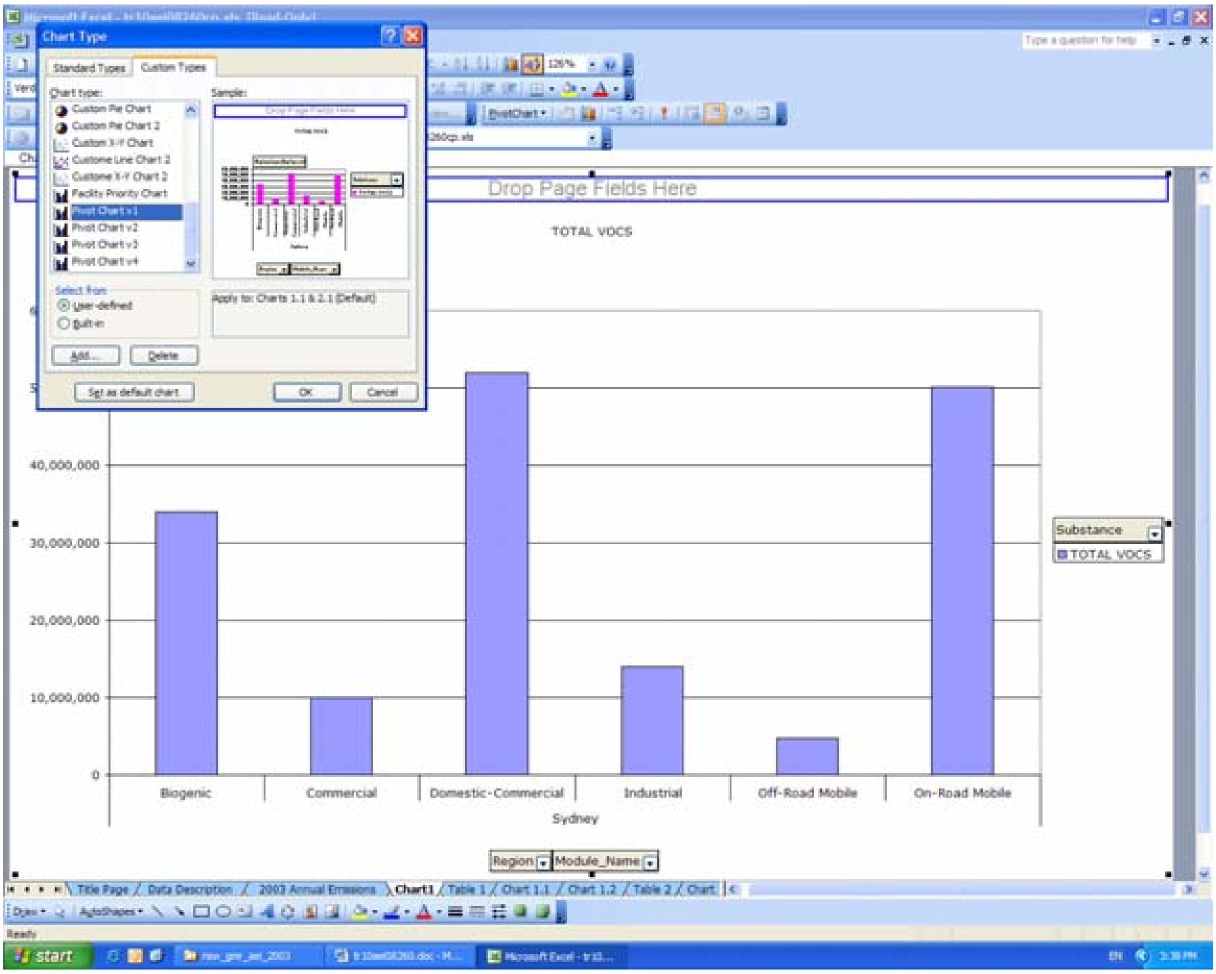


Figure 2.55 Example 6 – Select "Custom Types" and "User-defined"

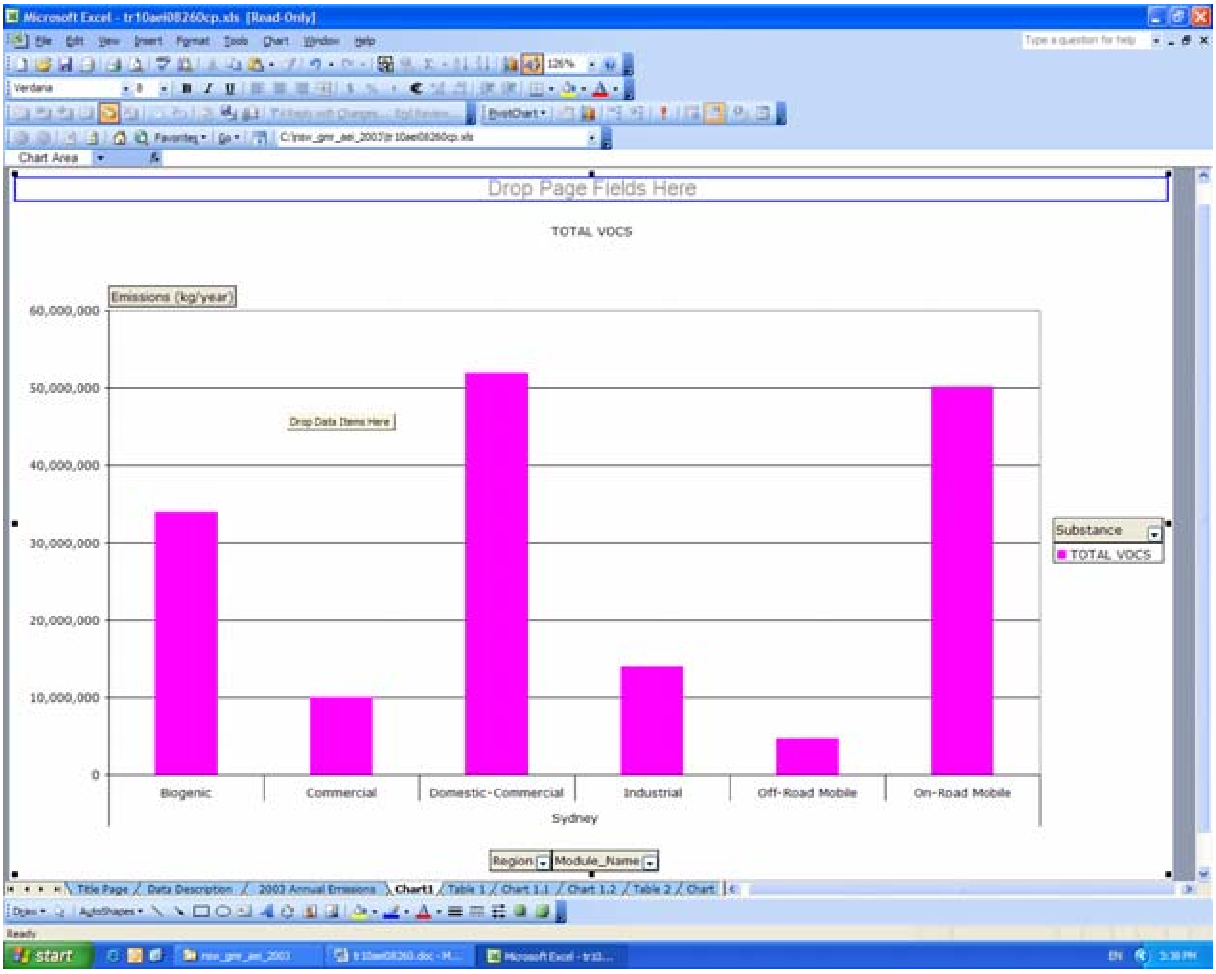


Figure 2.56 Example 6 – Select "Pivot Chart v1"

- **Step 9** – You may wish to change the scale on the value axis. To do this, select the left vertical axis of the plot area, right mouse button click and select "Format Axis" as shown in Figure 2.57. Select the "Scale" tab and under "Value (y) axis scale" and "Auto", uncheck the "Major unit:" box and insert "5000000" and select the OK button as shown in Figure 2.58

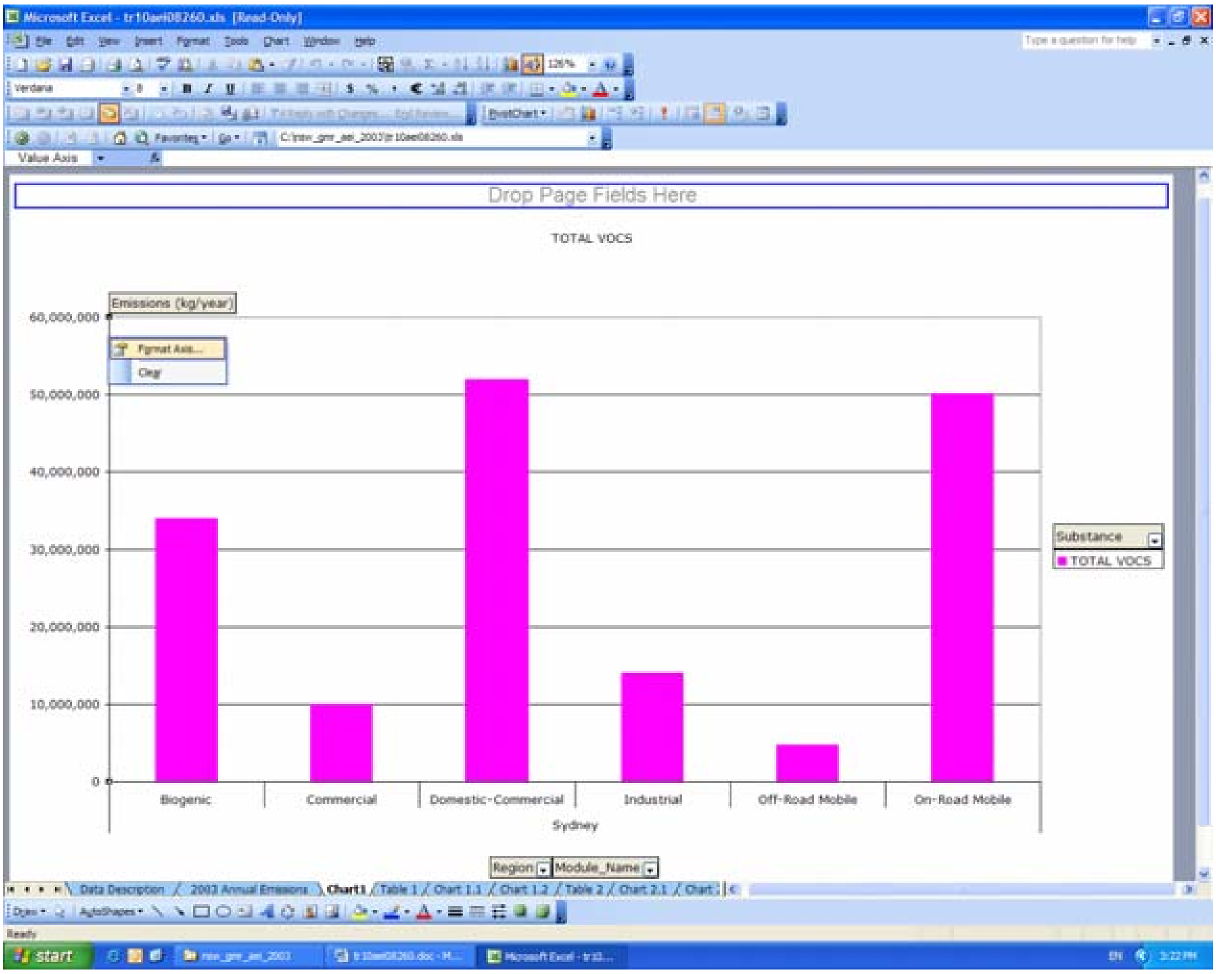


Figure 2.57 Example 6 – Select "Format Axis"

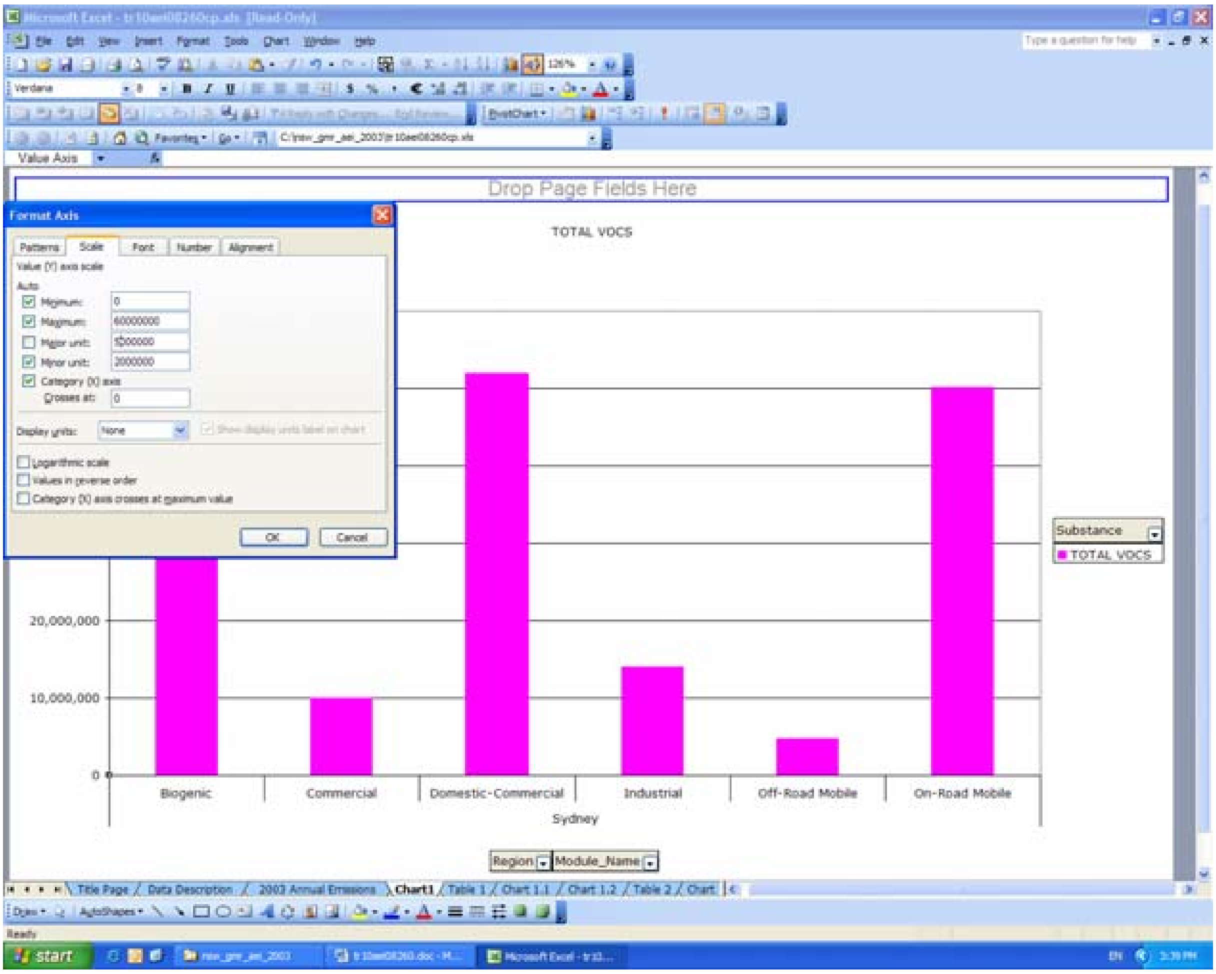


Figure 2.58 Example 6 - Select “Scale”

- **Step 10** - The final pivot chart report will now look like that shown in Figure 2.59. Please refer to "Help" in the command menu for further assistance

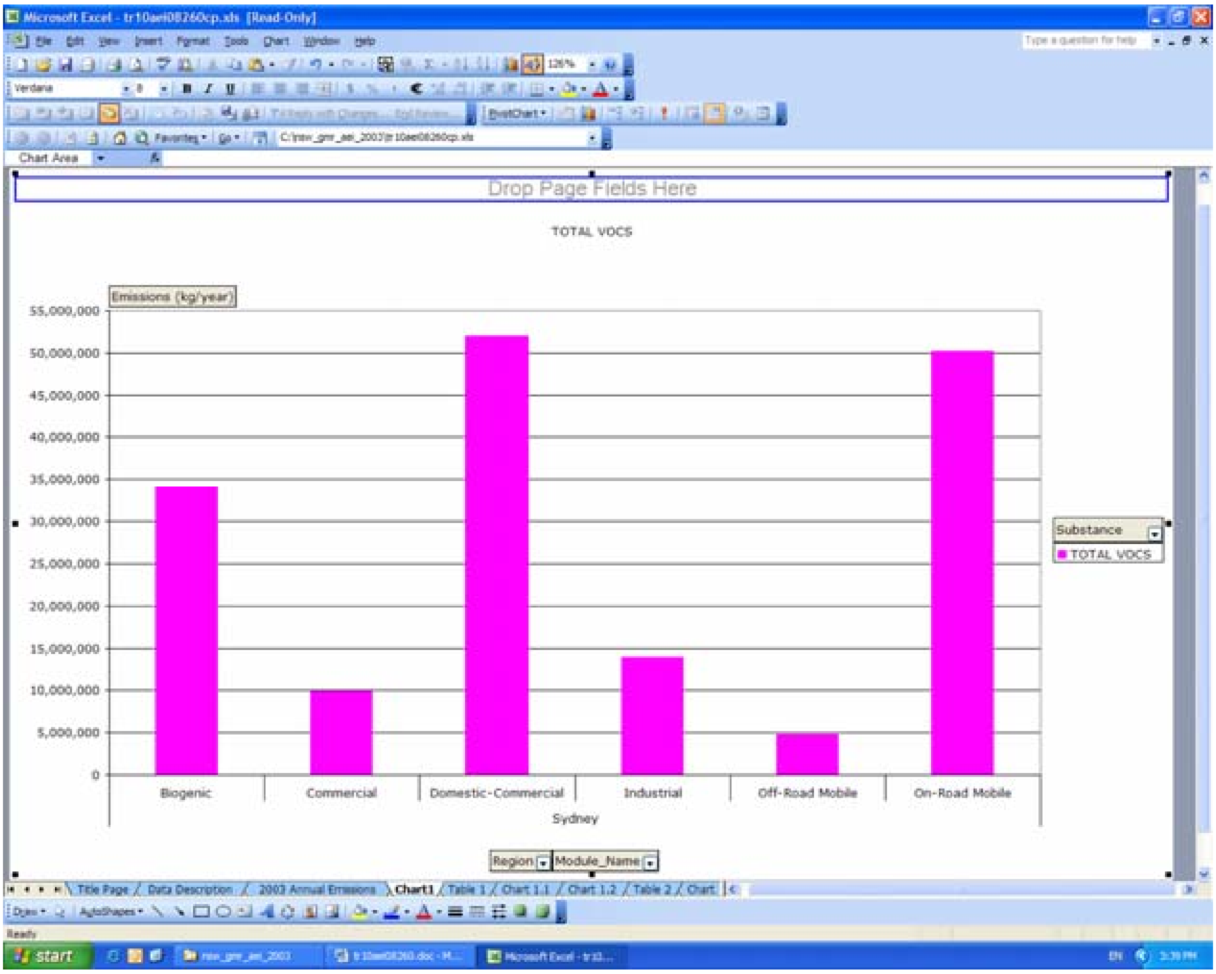


Figure 2.59 Example 6 – Formatted Pivot Chart Report

- **Step 11** –You may wish to hide the pivot chart field buttons. To do this, select any of the pivot chart field buttons, right mouse button click and then select "Hide PivotChart Field Buttons" as shown in Figure 2.60

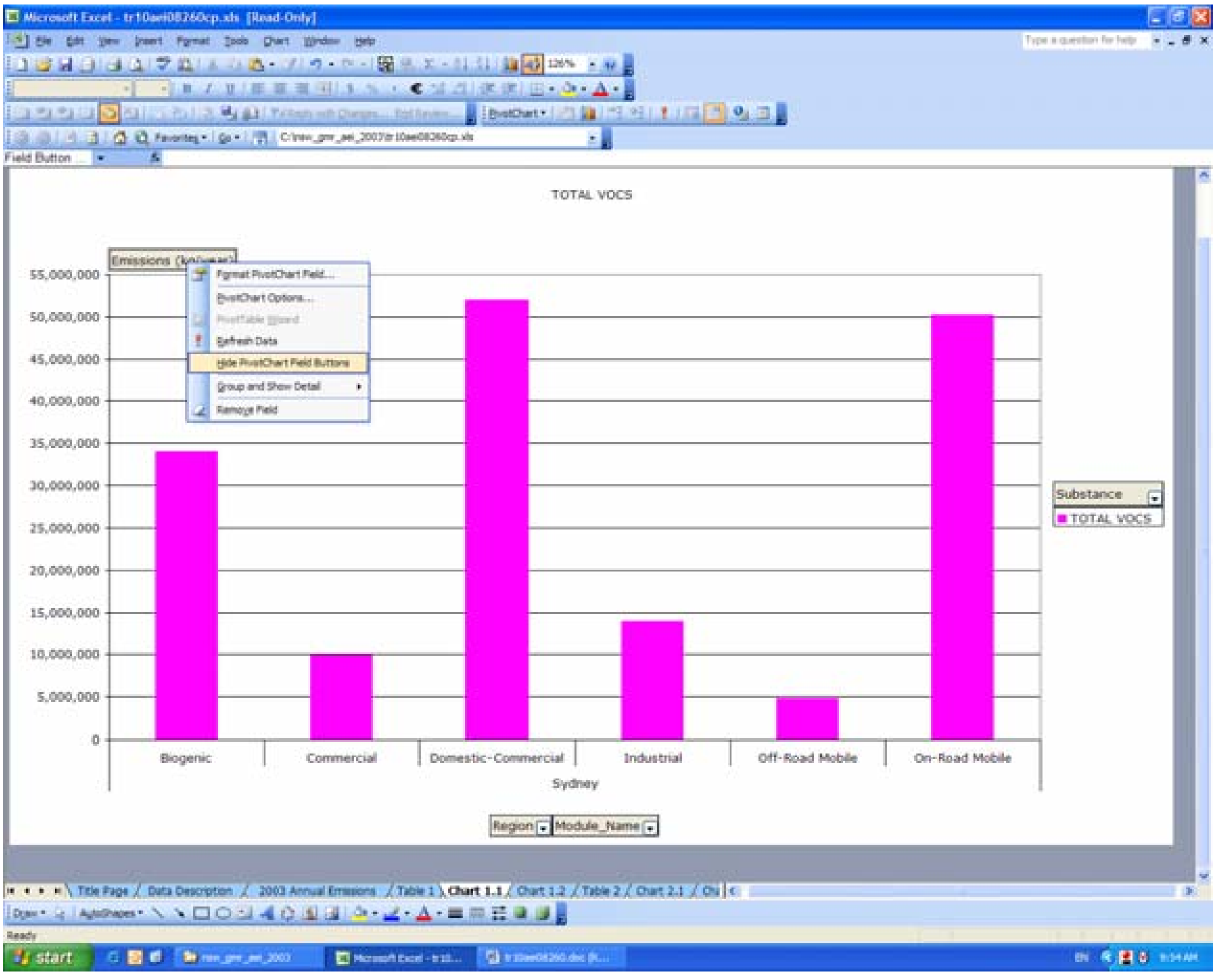


Figure 2.60 Example 6 – "Hide PivotChart Field Buttons"

- **Step 12** – Copy the chart from the Excel™ workbook, past into a Word™ document if required and format as shown in Figure 2.61

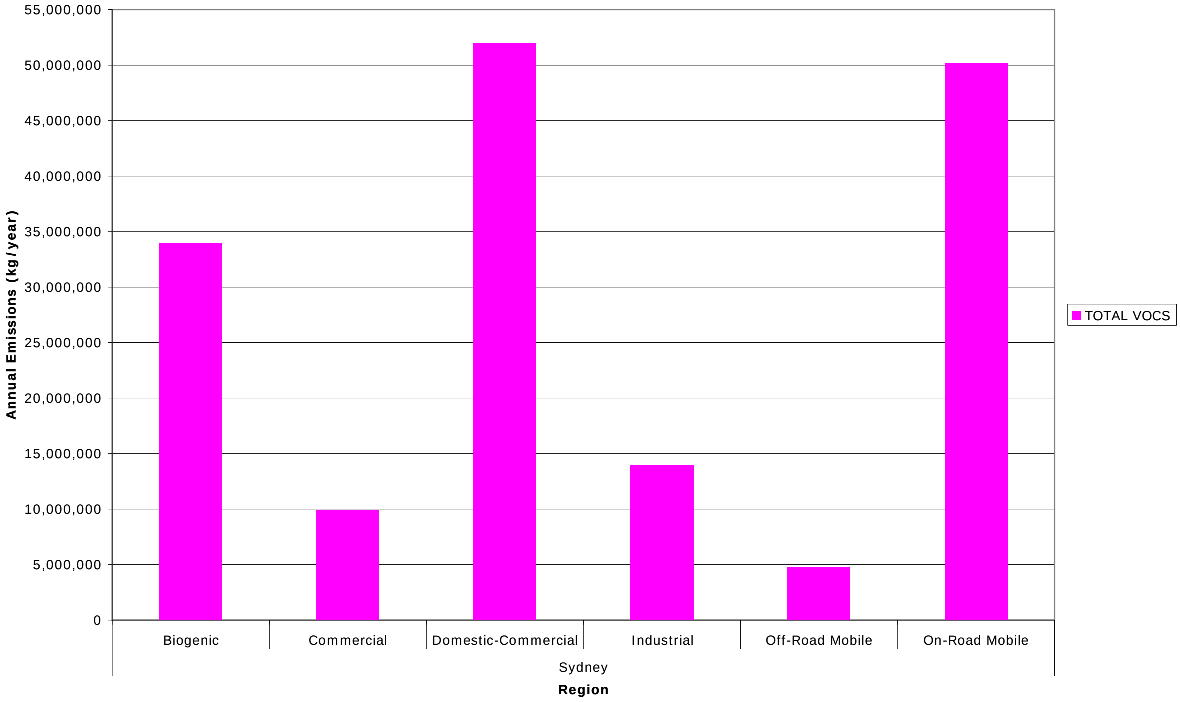


Figure 2.61 Example 6 – Formatted Word™ Chart

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